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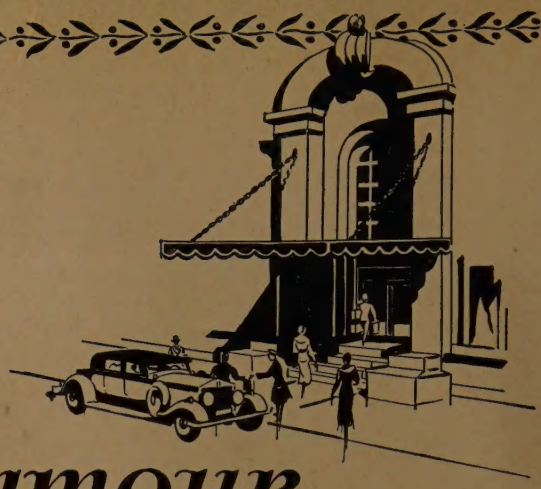

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On August 31 about 2:30 in the afternoon the moon will pass between our planet and the sun causing what we call an eclipse of the sun. Several scientific expeditions will set up strange-looking equipment to gather new data and learn more secrets of that huge ball of fire ninety-three million miles distant.

Spectroscopes, giant telescopes, and mammoth cameras (one 85 feet long) will be employed among other measuring and recording instruments.

Where clouds do not completely obscure it, this eclipse will be visible in totality in the New England states and as a partial eclipse all over the United States with the possible exception of the extreme southwest.

Amateurs with ordinary cameras can make photographic records of the eclipse by using the fastest shutter speed and the smallest "stop" or diaphragm opening in the lens. If the sun is not diffused by clouds, better results will be obtained by employing a deep-toned filter, like the Wratten G filter, over the lens in addition to using the smallest lens aperture. Naturally, with simple snapshot cameras the images will be very small, but the record will be interesting and striking enlargements can be made from negatives secured.

If you have a tripod or can set the camera on some solid support, point it toward the sun when the eclipse starts and make a series of exposures at five-minute intervals. Do not turn the film; the series will be recorded on the one section of film. Place your camera so that the sun can be seen in the extreme upper right corner of the finder. Do not move the camera.

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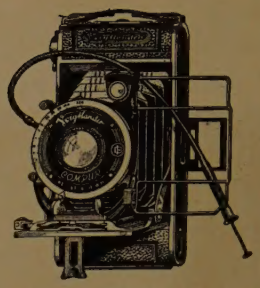

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In narrow glens or ravines where the daylight is much dimmer than it is out on the open landscape, bands of sunlight often enter through clefts in the rocks or through spaces between the leaves when there are trees at the summit or far up on the steep side of the ravine.

Where it is dust or water vapor that reflects the sunlight the bands can be photographed with any kind of camera, provided the streamers of light are clearly outlined against a shadowy background. The exposure to give depends on the background. A snapshot will record the sunbeams, but if the background is quite dark a very short "time" exposure with the ordinary camera will be needed to record slight detail in the dark background.

Very often pictures introducing sunbeam effects will be found to have a genuine dramatic as well as pictorial interest. They will frequently suggest the "spotlight" of the drama.

Night Pictures Now Easy

Device Also Helps Catch Criminals

Worthy of special mention to anyone who owns a camera is word concerning a device that will simultaneously set off a Photoflash Lamp with the operation of the camera shutter. This means that even action pictures can be taken at night almost as easily as making daytime snapshots.

The gay group on the porch, the campfire gatherings, and the beach parties are among the summer subjects that can now be pictured at night. Such photographs have an appeal all their own because they are so different from daylight pictures. Due to lack of any background detail the principal images stand out in bold relief against a black, night-effect setting.

As to more serious photography, this device with the aid of the Photoflash Lamp can be (and has been) used to identify criminals. The camera, attached to door or window, can be made to operate in conjunction with the flash bulb and thus record

a perfect picture of an intruder. This in fact has been done.

A copy of the picture and complete details of the occasion on which it was made will be sent on request, as will information about the device and the Photoflash Lamp that make this kind of picture possible. It occurs to us that children's rooms might all well be so equipped if the apparatus is as reliable as we are led to believe.

Constructive Criticism

Were you to merely glance at the picture above you would suppose it had been made solely as a view of the side of a garage. Upon closer inspection you see the image of a lady with her pet dog. Doubtless these two are the real subject of the picture, but they are woefully subordinated.

Technically the picture is good, the focus was adjusted to give a sharp image at the distance and the exposure was sufficient to yield a negative from which a good print was made.

The camerist probably stood twenty-five feet away and if he *wanted* a picture of the side of the garage with the live figures as "incidentals" he got just that. If a picture of the lady and the dog was desired, our friend should have stood but eight or ten feet away and, of course, set the focus for the nearer distance. It might also be mentioned that the prominent horizontal lines formed by the masonry of the wall would be a bit distracting in any event, and a clump of bushes or distant foliage or even a plain wall would make a better background setting. The principal criticism, however, is the waste of so much picture space when the subject could have been taken so that it occupied at least a third of the picture area.

Newsy Notes

Further Information and Literature on Request

Pocket tripods that collapse to 7" and extend to 45"; flat when closed; rugged and rigid! Seems like a mighty convenient accessory.

"Nature Photography" is the name of an interesting and instructive volume by Oliver G. Pike. A book for the real camera-nature enthusiast.

"Cash from Your Camera" is another book that sounds interesting. Tells how and where to market pictures.

The 18th edition of the text book, "How to Make Good Pictures" is soon to be off the press. Over a million copies have been sold!

"Amateur Cinématographers' Hand Book;" Robert Dykes, F.R.P.S. An inexpensive and comprehensive little volume for the movie enthusiast.

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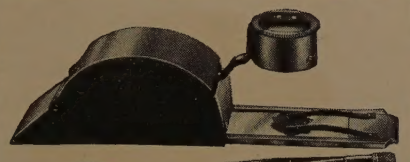

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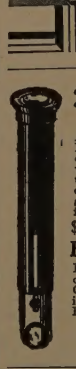

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To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great Natural Resources of America

CONTENTS FOR JULY · 1932

The River Turtle (See Page 23) Jean W. Petite Cover
Photographic Department....Robert T. Lowell 1
What Is Will-O'-The-Wisp? Charles Fitzhugh Talman 7
The Laziest of Plants.....Harold Harris 11
Eucalyptus Trees.....Mary Earle Hardy 12
Australian "Bears".....Winifred Duncan 13
Bower of the Satin Bird.....Kilroy Harris 16
A Queer Cocoon.....Robert E. Coker 17
A Photographic Hobby..Estelle Cobb Wheeler 20
Baby Birds at Play.....Maud Ballington Booth 21
A Western River Turtle.....Jean W. Petite 23
The White Birch.....L. W. Brownell 26
The Ruby Stands for Love..August Pohndorf, Jr. 27
A Clapper Rail Quest.....John Bartram 28
Hot Water Fishes of the Desert John Edwin Hogg 29
Burs of Common Plants.....S. Comstock-Miller 33
Birds that Sing at Night.....Gordon Wilson 34
It Throws Seeds.....Freda Detmers 35
A Memorial Arboretum..... 36
Some Brilliant Summer Stars....Isabel M. Lewis 37
Bears Are Funny.....Uncle Dick 39
Prinny.....Matilda B. Doland 41

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FOOD GARDENS

• • •

DO THEY OFFER A REMEDY FOR UNEMPLOYMENT?

• • •

The Editors of Nature Magazine will sincerely appreciate the frank reaction of any of our readers to the suggestion contained in the following editorial, or any comments or observations bearing upon the application of the idea

THE VALUE of garden making has usually been presented to most of us from the angle of the esthetic or from the viewpoint of healthful and delightful recreation. Yet during the Great War the home food garden movement fostered by the National War Garden Commission swept America and spread even to other nations as a constructive means of meeting a food shortage. Today in an entirely different kind of economic emergency a similar idea has come to the fore. The little community of Lakewood, New Jersey, had as its chief industry the support of hotels for weary week-enders from the great cities nearby. The depression came. Week-enders stayed at home. A large part of the population of Lakewood found itself jobless, and work for the unemployed simply did not exist. Then the leaders of the community, under the direction of Mr. Charles Lathrop Pack, former President of the National War Garden Commission, got together and evolved a plan. Vacant land about the town was leased or contributed and divided into small plots to be made into a multitude of individual food gardens; fertilizers and seeds were procured wholesale and each unemployed person willing to undertake real work was assigned a place. As the gardens grew, so also grew the saving grace of self-respect among those who cultivated and labored there. Men and women might indeed still be charges on the community, but at least they had honest work to do, and by the very measure in which they did that work well they and their families would raise food for themselves. The committee in charge has not stopped with the garden plan alone. The families of the toilers in the gardens are being taught to put up the vegetables and preserve them for the winter ahead, and this they are now doing.

The Lakewood plan offers not only potential food for the unemployed, honestly earned, but it presents, as well, much food for thought. Critics have suggested that such a scheme is unfair to the long suffering farmer who is told constantly that over-production is his nemesis. But today the world is topsy-turvy, and in America, the so-called land of too much plenty, thousands are literally starving. Many economists and representatives of organized food industries do not join with the hasty critics of home gardening. They know that the trouble is not that farmers produce more food than people can eat, but that there is more food than Americans have the money to buy. They recall, also, that the nationwide interest in food gardens during the War stimulated the home consumption of vegetables almost unbelievably. They realize that it may well do so again, for the many millions of city dwellers who cannot possibly undertake to raise their own vegetables under any plan will be affected by their reading about gardens and, just as they did before, will buy vegetables and fruits more freely. Then come the economic experts who have been predicting the supplanting of the old type farmer, who did nothing but farm, by the suburban agriculturist who works at least part of the time in the city and raises food as a secondary occupation. They recognize in the newly revived food garden movement only another force, adapting our economic system to a more sane and simple basis, and short-cutting that expensive and unnecessarily complicated system of distribution which now results in waste and in poverty and hunger amid a land of plenty.

We, editorially speaking, have pondered the question. It seems to us that the readers of NATURE MAGAZINE should have a very special interest in gardens, and in the place of gardens in the scheme of things. We should like to hear from our readers as to what some of them may think of the Lakewood plan and as to whether it is or is not applicable to thousands of similar communities throughout the United States. We should like to have the American Nature Association play its part in meeting the great problems confronting America today.

SILHOUETTES OF THE WOODLAND AS FASHIONED BY THE DEFT SHEARS OF GEORGE HITT OF TOCCOA, GEORGIA. HIS STUDIO IS A WHEEL-CHAIR; HIS LOT ONE OF PAIN AND TWISTED LIMBS; HIS ACQUIRED ART HIS CHIEF JOY; HIS HOPE THAT HE MAY CARRY ON THE WORK THAT JOE JONES LEFT TO DO WHEN HE WAS CALLED AWAY FROM US

NATURE MAGAZINE

VOLUME 20 JULY · 1932 NUMBER 1

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THE ELUSIVE WILL-O'-THE-WISP FROM F. REINZER, "METEOROLOGIA PHILOSOPHICO-POLITICA," AUGSBURG, 1709

The notion embodied in this picture that will-o'-the-wisp flees before its pursuers, is very old but probably unfounded

WHAT IS WILL-O'-THE-WISP?

THE STORY OF A NEGLECTED MYSTERY

BY CHARLES FITZHUGH TALMAN

IN THIS paradoxical world of ours, where incredible things are constantly happening in all phases of existence, I know of no more remarkable paradox than this:

For ages mankind has been acquainted with a strange manifestation of Nature generally called in English "will-o'-the-wisp," and in the universal language of scholarship *ignis fatuus*. It has many other names in most modern languages, including nearly fifty in the British dialects alone, and its diversity of nomenclature is one of the best of reasons for believing that the thing described by these names is a reality and not a myth. An idle tale that spreads from place to place carries its nomenclature with it, but a fact of Nature may acquire a local name wherever it is observed.

Another reason for believing that will-o'-the-wisp is not a myth is that hundreds of thousands of human beings have reported seeing it, while among the persons who have given circumstantial reports of such observations there have been many scientific men, whose senses could hardly have deceived them. Neither has the scientific world, in general, ever been disposed to doubt the reality of this phenomenon.

And yet—here is the paradox—though will-o'-the-wisp is a complete mystery—as much so today as it was when, some generations ago, students of Nature took a keen interest in it and sought eagerly to explain it—science at the present time *almost entirely ignores it*. If you are not familiar with this extraordinary situation, consider these facts:

Will-o'-the-wisp has generally been classed, rightly or wrongly, among the phenomena of the atmosphere, and

FROM C. FLAMMARION, "L'ATMOSPHERE."

WHERE SOLDIERS WERE BURIED DURING THE SIEGE OF PARIS

These eery flames appeared, we are told, over their common grave. But a photograph would be more convincing than this drawing

when, in the seventeenth century, the Royal Society of London issued the first instructions ever formulated in English for taking meteorological observations, this phenomenon was listed along with clouds, rain, lightning and other atmospheric manifestations that were to be recorded in the daily register of weather. Nowadays there is not a meteorological institution in the world that collects records of will-o'-the-wisp, and there is hardly a textbook of meteorology published within the past fifty years that even *mentions* it.

The articles about it in the encyclopedias are always brief (there is one eight lines long in the latest edition of the Britannica, and there was none at all in the preceding edition), and the information they contain is antiquated and quite obviously erroneous. They invariably mention certain tentative explanations in terms of chemistry that make chemists smile—but unfortunately the chemists themselves are as little interested in solving the mystery as the meteorologists. The subject is hardly ever referred to in chemical literature.

There is, in the aggregate, a good deal of information about will-o'-the-wisp scattered through the files of scientific journals—mostly German, and mostly from fifty to a hundred and fifty years old. It is an astounding fact, however, that nobody —even in Germany—has yet produced a book devoted exclusively or primarily to this universally interesting and apparently very widespread natural phenomenon, nor has anyone ever compiled a comprehensive bibliography of the subject.

The first attempt to collect descriptive accounts of will-o'-the-wisp from fairly trustworthy sources was made in Germany in the first half of the last century by Poggendorff, the famous editor of the *Annalen der Physik,* and numerous detailed reports were published in that journal from the year 1838 onward. One of these that has often been quoted came from the astronomer Bessel. He told of having, many years previously, seen will-o'-the-wisp over a moor near Bremen. At the time he was in a boat on the River Wörpe, and was unable to approach the lights, which appeared over some flooded land adjacent to the river. They occurred in the form of little bluish flames; some stationary and some moving in groups, like flocks of birds.

The reports assembled by Poggendorff give us a somewhat definite idea of what will-o'-the-wisp looks like and how it behaves, and they do not correspond altogether with traditional notions on this subject. The light was usually described as having a flame-like appearance and being suspended a few feet above the ground; and although it might move about within a limited radius it did not display its proverbial fondness for flitting ahead of the traveler who sought to overtake it. Access to it was generally difficult because it was seen mostly over marshy or flooded ground (seldom over graveyards), but several persons, in-

WILL-O'-THE-WISP

As it is pictured in J. Rambosson's "Histoire des Météores" published in Paris in 1869

cluding some professional scientific men, reported viewing it at close range and even touching it.

There was one celebrated case in which Professor Knorr, of Kiev, held the ferule of his cane in one of the flames for a quarter of an hour without its becoming perceptibly heated. Another observer, Major Blesson, was able, though with difficulty, to light a piece of thin paper by holding it in a will-o'-the-wisp; but nearly all the evidence of that period indicated that the lights possessed little or no heat, and it is possible that the one encountered by Blesson was of a different nature from most of the others reported.

Since Poggendorff's time three or four other German writers have published collections of anecdotes relating to will-o'-the-wisp, and several were published by the English chemist T. L. Phipson in the London journal *Belgravia* for September, 1868. Here are two typical stories from Phipson's collection:

(1) A Mr. J. H. Humphrey reported that, one fine summer evening in 1840, he was walking with a cousin by the road from Dunoon to Holy Loch, in Argyleshire, when they came to a large reedy pool, usually cov-

A SEVENTEENTH CENTURY CONCEPTION

This picture from a work by E. Francisci (Nürnberg, 1680) illustrates the conventional method of representing ignes fatui in works of that period; the objects bearing a vague resemblance to white birds

ST. ELMO'S FIRE ON PLANTS

As produced in the laboratory of C. von Tubeuf, and pictured in Naturwissenschaftliche Zeitschrift für Land- und Forstwirtschaft, 1905

ered with fine water-lilies, on the left side of the road. It was dark, and they both saw several lights, "precisely like the flame of a common candle," flitting across the surface of the pond from one sedgy part of it to another. They stood still and observed the phenomenon attentively. The cousin, who lived in the neighborhood, remarked: "Those are the will-o'-the-wisps, to be seen frequently." They went close to the edge of the pool and "there was not a boy or a man besides themselves near the spot." The lights appeared to leap from place to place and then to vanish, just as though lighted candles were thrown across the pond and fell into the water. They did not rise more than a foot or two above the surface.

(2) In September, 1858, a lady with her little girl and a clergyman were benighted and lost their way on one of the Taff Vale Mountains, South Wales. Being on horseback, among dangerous bogs, in intense darkness, they moved cautiously along in search of a road; till, passing a little dell or ravine with a wall at the bottom of it, they saw just across it many bright lights apparently swung about near the ground. These they took to be lanterns, carried by men sent out to look for them. After they had

shouted and received no response, the little girl dismounted from her pony and scrambled down to the wall, some thirty yards distant, then exclaiming, "They are will-o'-the-wisps, mamma, and it's an awful bog." This proved to be the case, for there were no human beings within miles of them.

One of the most interesting reports of recent years was that published in 1920 in the Belgian journal *Ciel et Terre* by a retired army surgeon, Jules Rossignol. He observed the mysterious lights on many occasions in some marshy woods near Grupont, Belgium. They assumed the form of little white clouds, which rose from the ground and changed to luminous globes after attaining an altitude of a dozen yards, and they remained visible for several minutes.

FROM H. MOLISCH, "LEUCHTENDE PFLANZEN"

A BACTERIAL LAMP

It contains a colony of luminous bacteria and gives enough light to read by

In the United States two especially convincing reports have been published in our own times. One of these, which appeared in the *Scientific American Supplement* of December 9, 1916, came from the well-known electrical engineer and authority on luminous phenomena, Dr. Matthew Luckiesh, who encountered the lights in great numbers while passing over some temporary pools of shallow water in a Nevada desert. The other was published in the *Mentor* of May, 1925, by Prof. L. A. Hausman, who was then teaching zoology at Cornell University. He observed the display in question about nine in the evening while traveling over a road leading through a boggy woodland near Cayutaville, New York.

"It consisted," he says, "of five separate flames or globules of bluish light about the size of half-dollar pieces, waveringly suspended, apparently in midair, among some reeds and bushes above a marshy tract of ground and about fifteen feet from the roadway."

From these recent accounts it appears that will-o'-the-wisp has not gone the way of the dodo—and there is no conceivable reason why it should have done so. If this puzzling variety of Nature's fireworks ever existed—and the evidence is overwhelming that it did—it must exist today, and a moderate amount of scientific investigation would probably dispel the mystery that has hitherto enshrouded it. Neither is there any apparent justification for the statement, found in many books, that, having formerly been rather common, it has now become extremely rare. It may, indeed, have disappeared from places where swamps have been drained and replaced by dry land; but there are millions of acres of swamps left in the world. Probably it has always been rare except in certain localities. Dr. Luckiesh, in recording his experience mentioned above, states that he had never before seen this phenomenon or met anybody else who had seen it. Mr. H. S. Barber, of the United States National Museum, who specializes in the study of luminous insects, tells me that, although he has prowled about swamps at night for years, he has never encountered anything that he considered to be will-o'-the-wisp.

Mr. Barber once received, however, a letter from a man in Ohio who claimed that he had not only seen but *caught* a will-o'-the-wisp—and that it turned out to be a luminous mosquito. Now it is known that, besides fireflies and glow-worms, which are normally luminous, there are several kinds of insect that become luminous through the effects of disease, and among these are some relatives of our American mosquitoes, the chironomid gnats of Europe, little shining clouds of which are sometimes seen by night drifting slowly with the wind. These swarms of luminous gnats doubtless explain many reported cases of will-o'-the-wisp.

Moreover, luminescence, or "cold light," is a widespread phenomenon of the living world and not all of its strange manifestations have yet received the attention they deserve from naturalists. Molisch, the well-known German authority on this subject, tells us that some forty-five species of fungus, including about twenty species of bacteria, possess the property of emitting light. Perhaps the most plausible explanation of will-o'-the-wisp yet offered is that of Professor Fernando Sanford, who, in the *Scientific Monthly* of October, 1919, suggests that the apparent flames of this phenomenon consist of luminescent bacteria carried up from marshes and wet grounds by rising bubbles of gas.

Of course mysterious lights seen at night in circumstances that do not permit close inspection might be due to a variety of causes. Birds (especially owls) with luminous fungi clinging to their feathers have sometimes been reported as will-o'-the-wisp. "Fox fire," the phosphorescence of decaying wood—also due to a luminous fungus—might easily be so reported by anybody unfamiliar with this fairly common phenomenon. St. Elmo's fire, the well-known brush discharge of electricity, not only occurs on the spars of vessels at sea and on the spires, lightning-rods and ridgepoles of buildings on land, but it has been seen on a great variety of natural objects, including animals and plants. It has probably sometimes been mistaken for will-o'-the-wisp, but the latter has been reported mainly in the absence of the conditions that make St. Elmo's fire possible; viz, a highly electrified state of the atmosphere, such as prevails in thunderstorms, snowstorms and duststorms.

Lastly, chemical explanations, found in numerous reference books, ascribe the phenomenon to the combustion, spontaneous or otherwise, of gases arising from decaying organic matter in the ground; especially methane (marsh gas), phosphine and hydrogen sulphide (sulphuretted hydrogen). No one of these substances, however, and probably no combination of them could produce flames, or luminous globes, devoid of smoke and odor, corresponding at all closely to descriptions of will-o'-the-wisp.

One more objection to the chemical theory is that there can be no combustion of gases, so far as we know, that does not yield *heat*. The evidence—such as it is—seems to indicate that the weird flames we have been discussing are heatless; and so it is in the still little-explored domain of luminescence that science seems most likely to find the answer to the question asked in this article.

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THE LAZIEST OF PLANTS

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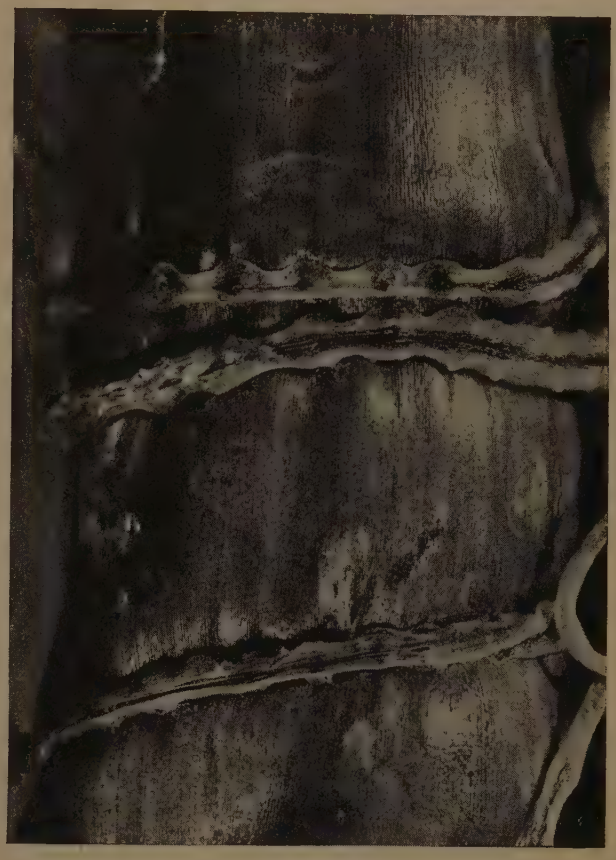
DODDER DOES NOT DIGEST ITS OWN FOOD

• • •

BY HAROLD HARRIS



STRANGLING A STEM OF BUCKWHEAT

The darkened spots show where the dye solution has been sucked directly from the host. At the left appear the simple blooms of this deadly parasite

DODDER—devastating weed parasite of alfalfa, sweet clover, flax and other crops—assimilates the plant juices from its hosts just as they are, without any chemical, filtering, or digestive processes whatever taking place. This striking fact is brought out in recent experiments by Dr. R. B. Harvey, plant physiologist at the Minnesota Agricultural Experiment Station.

Dr. Harvey's investigation shows for the first time that the suckers or haustoria of the dodder suck the plant juices of the host directly into the circulation system of the parasite. The nutritive relation between the dodder and its host, therefore, is even more direct than that between the mother and her unborn babe.

To determine the connection between dodder and a stalk of buckwheat, Dr. Harvey cut off the buckwheat stem and placed the cut end into a solution of dye. The dye not only penetrated quickly to all parts of the xylem of the buckwheat, but also entered the xylem of the dodder, its progress being readily traceable by the colorations. This ingenious scheme permits graphic proof of the process.

In the accompanying magnified view of the buckwheat, with the dodder twining around it, spots of color due to the dye may be seen at the rounded enlargements in the dodder vine. This same photograph shows clearly the damaging hold which dodder takes upon its host plant. Each of the rounded enlargements of the dodder vine indicates the location of a haustorium or sucker.

Previous to Dr. Harvey's work, it was thought that although the dodder, and other parasitic plants, took its food entirely from its host, it probably put this juice through some sort of digestive process. The fact that it does not, and that dodder can subsist on hosts of several different varieties, suggests the remarkable adaptability of this plant. In your rambles afield look for some examples.

A DRIVE FRAMED BY EUCALYPTUS TREES
These trees from Australasia add a world of beauty to the West Coast

EUCALYPTUS TREES

AS ORNAMENTAL AS USEFUL

BY MARY EARLE HARDY

PHOTOGRAPH BY G. G. McLEAN

EUCALYPTUS trees well suit our age of energy and hustle, for they grow five times faster than any other known trees. They are natives of Malaya and Australia but have taken so kindly to our west coast country as to wholly change the once treeless plains of Southern California.

Their singular beauty attracts tree lovers while the business man is interested in their general usefulness.

A eucalyptus may produce in twenty years as much wood as an oak in a century. The blue gum, *Eucalyptus globulus*, has been known to reach a height of twenty-five feet in eighteen months after seeding and sixty-five feet within six years. If the young trunk is cut down, it at once sends up half a dozen new trees from the pollarded stump. It is not uncommon to see eucalypts towering fifty or even seventy feet before sending out lateral branches, as if bound to make themselves tall enough for shipmasts. In their native habitat, they grow to be three hundred feet in height.

In some species the grain is beautiful, surpassing the oak in hardness and elasticity; its tensile strength equals the hickory, giving it great value where fine grained, hard timber is desired. Manufacturers have long imported the wood under the name of "Australian Mahogany." Since the trees are uninjured by the borers they are ideal for sea-piles. For railroad ties the wood has proved almost indestructible. When properly cured, it is fine for house-furnishings and cabinet work. Its leaves, when crushed, give the eucalyptus oil so extensively used; a ton of leaves yields twenty pounds of oil. From the bark of the tree a juice exudes that quickly hardens and becomes the kino of commerce.

There are somewhere between one hundred and two hundred varieties of eucalypts, the most common of which are the blue, gray, red, and sweet gums. Each has considerable individuality. Whether growing by the roadside, gracing lawns, or crowding shoulder to shoulder as windbreaks for protection of gardens and tender fruits, each tree maintains its own especial character. Although somewhat long limbed and awkward, every one has a rugged dignity. The green of their leaves, seen from below, has the iridescence of a duck's back. The young twigs of some species are rich carmine and the young leaves shimmer with metallic blues and purples; seen from beneath, they are white and downy with veinings of red. The flowers are as fluffy as Venus' paint brushes, and their white, cream and rose clusters are full of fragrances.

Planted in marshy and malarial regions, eucalyptus trees drink the marshes dry, and by reducing disease-bearing insects and subtle chemical processes return health and sweetness to the locality. This they have done to the once malarial regions of Rome, and in other plague-stricken parts of the Old World they are called "The Good Fever Trees."

LIKE A FURRY FRUIT
The Koala clings to his eucalyptus tree, upon the leaves of which he must feed or perish

AUSTRALIAN "BEARS"

SLAUGHTERED BY MAN, THE KOALAS MAKE A LAST STAND

BY WINIFRED DUNCAN

IN THE days when the black Australian native still roamed through his ancestral bush, notched boomerang in hand, there dwelt, in the tree tops far above him, millions upon millions of little shy animals called, in native tongue, the Koala, or Kulla, or Colah. Whichever they called it, they were all agreed on one point, which was that Koalas were not really bears at all (and they were right enough) but were the returned souls of all the little babies in the tribe that had died.

And so these little dears lived—worshipped and unmolested—in the great waving tree-tops of the Australian bush, finding out how happy a little lost soul can be, when it is furry and round, and completely surrounded on all sides by that most delectable of foods, the eucalyptus leaf.

Then came that scourge of all happy primitive life—"civilized" man. The native people were, as usual, slaughtered and driven out of their bush; thousands of the majestic eucalyptus trees were cut down; hunting dogs and guns were introduced into Australia. Clinging like pussy-willows to their beloved trees, the wistful-eyed little bearlets were murdered in cold blood, although defenceless, speechless, and innocent of any harm at all. Thousands, millions of them fell like autumn leaves before the rifles of these conquering heroes The Queensland government declared an "open shooting season" and turned loose 10,000 trappers to hunt the Koala for fur skins. The wagon loads of fur skins were sent to America, for the most part, where it became quite the fashion for ladies to wear a murdered Koala or so attached to their necks and wrists.

After the extermination was well-nigh complete, a great wave of sentimentality swept over the Australian world. "Our dear little native bear," they said, "is dying out. What a shame. Something ought to be done about it." And life went on, as usual.

Except for one man, for whom, after having held one of these baby bears in his arms, and seen it weep like a baby, with real tears, life did not go on as usual, but very differently. So much so, in fact, that he devoted his life then and there to saving this exquisite and unique little animal from total extermination. To tell the tale of this fight to save helpless lives would take too much space; to tell of the search for land, for money, for knowledge, embarked upon by a young man then 22, who started without a cent, in a boarding house in Brisbane, with four little lonely bears that he had collected and placed in the backyard.

Now, entirely through his own amazing initiative and enthusiasm, he controls fifty acres that he has converted into an exclusive park for the planting of eucalyptus trees, the breeding of Koala bears, and as a sanctuary for other animals not wanted elsewhere. This is half an hour by train from Sydney and is one of the most interesting spots in the world. There are two parks for the bears, summer and winter quarters; there is a hospital, looking for all the world like a baby-clinic, with

its white basket for weighing the little bears, a big chart with the pet name of each listed, its weight, its age, its sex and color; there are nurseries where hundreds of tiny eucalyptus trees are set out in pots, patiently waiting to grow up. They are slow growers; to quote their owner—"they mess about for eighteen months or so, then they start to find themselves." These trees are like the fastidious bears who feed on them; it takes great patience and love to rear them.

As for the bears, they are everywhere—wedged in the forks of all the big branches over your head—their lovable, furry little rumps forming a semi-circle, their round, surprised little brown eyes gazing at you fixedly. They look aloof, self sufficient; yet when they reach your arms, instantly up go their little arms around your neck and with the most trusting expression in the world they lift up their soft dry noses for a kiss, clamp their furry stomachs against you, and hang there, motionless, holding on with might and main. And there they will stay, like motionless stomach warmers, for hours, unless they are detached.

NOEL BURNET AND TWO WARDS
The man who has devoted his life to saving a remnant of these persecuted marsupials

Words simply fail to describe the appealing charm of these little animals. Photographs fail to render it, because the Koala's nose, which photographs an ugly black, is not so in reality, but is a dull grayish black, harmonizing perfectly with its fur and giving not at all the snouty expression of some of the photographs. Also the ridge of fur which divides nose from forehead in the photo and is caused by the sharp toplight makes no such sharp division in the face of the little animal as you look at him.

From Mr. Noel Burnet's lips I received the details about these little bears. He is the only authority in the world on this subject because all other attempts by the zoos, or by private individuals, to keep this animal alive, have been failures. Only three Koalas have ever left Australia—a hardy old male that went to the London Zoo and lived just six weeks, and two bears which were taken to California and died almost at once. Now there is a law that what few are left of the bears cannot be taken out of Australia.

They are an ancient animal and, owing to a primitive digestion, can assimilate nothing except the leaves of some twelve varieties of eucalyptus. These varieties grow s i n g l y, sometimes hundreds of miles apart, and if the bear is fed on any of the other many varieties of the tree indigenous to Australia it will die. From this can be imagined the expense of that first year, when forty little Koalas had to be fed by hand from branches brought from hundreds of miles distant.

Before Mr. Burnet had made his investigations numberless Koalas were innocently slaughtered by Australians who caught them and kept them as pets for their children. Koala loves chocolate, cake, tea, and milk, and willingly abandons his leaves for it; but he dies of this diet in a few days. Like many leaf-eating animals Koalas drink no water. If given it they will try to chew it and it falls out of their mouths. When they are sick they have to be taught to swallow, before medicine can be got down them. Left to themselves they are likely to breathe water into their lungs. Then they die of pneumonia.

They are as delicate as they are charming, and are subject to conjunctivitis and tapeworm. Two were in the hospital the day I was there curled upon a little tree with an electric radiator beside them, although the day was warm. A careful study of these ailments is being made. The adrenal glands are well developed in these animals, and there is a suggestion that eucalyptus oil should be used for human adrenal cases.

The two great enemies of these little creatures are terrific storms that blow them from their trees, and the ground. They live in a perpetual fear of falling, in spite of the fact that they almost never do. Yet so unhappy are they on the ground that if they meet a stick, be it only a twig, they will lie down and wrap themselves around it in the hope and belief that it will lift them up into the tree again. Another extraordinary thing is that they will jump six feet, straight across space, from

PHOTOGRAPHS DO NOT DO THE KOALA REAL JUSTICE
The nose is really a dull grayish black, harmonizing perfectly with its fur and really not a snouty organ at all

one branch or tree to another, but they will not jump either up or down. They are slow and careful climbers, and move about with a soft, oozing motion most amusing to watch. Running on the ground they have the gait of any little awkward bear cub, but they immediately head for a tree and try to get up into the air again.

Koalas are marsupials, carrying their young in a pouch. They are also polygamous and do not go in pairs. The baby, which is born only one at a time and usually in alternate years, is only an inch long and looks like a big white ant; after birth it gets immediately into the pouch of the mother and no one knows how it gets there. In all his years of close association with the bears, Mr. Burnet has never seen one born. This embryonic child remains hidden in the pouch, nursing continually, until it is six months old. It is then five and a half inches long. At eight months it is too big for the pouch and emerges into the great world, where it attaches itself to the thick fur on its mother's back. At the end of one year it will weigh three pounds. At the age of three it is full grown, and some live to be from fifteen to twenty years old—but never in captivity. Mr. Burnet is the only person who has been able to give the little creatures enough sense of liberty to keep their shy spirits alive, and it has been a fight from the start against obstacles of which no one could warn him because no one in the world before Mr. Burnet knew anything about these lovable little beasts.

The American "Teddy-bear" has nothing to do with this little creature but was invented from the small brown bear of America. Australians, struck by the similarity of these stuffed toys to their native bear, imported them—and they are actually used on the farm to wean the Koala babies away from their mothers. Finding them soft and furry, the babies will hug them for hours on the principle that something is better than nothing.

Mother Koalas are very solicitous and will nurse their baby until it is nearly as large as they are, unless prevented. But they get their babies all mixed up, and do not care whose they nurse as long as they nurse something. Mr. Burnet says, "I finally got tired of sorting their babies out for them." Another peculiarity is that Koalas do not play; serious and silent they sit perched in their trees, gazing out at what passes them with an expression of perpetual wonder. The large males have an austere, philosophical expression, like that of an elderly sheep; the females look vague and surprised. You cannot say what the babies look like, because if you are human you cannot keep your hands off them in spite of the signs everywhere. Clutching them to your

heart, you will cease to care what their little expressions are if only they will just stay cuddled up like that with their furry cheek against your neck.

One of the sights I shall never forget is seeing these darlings in a pouring rainstorm, all bunched up like clusters of furry fruit, in the limbs of some ten miniature trees, each of which was surmounted with a big beach umbrella, from under which the Koalas looked coyly out at me. Their expression would melt a heart of stone and the knowledge that for years strong men have stood under trees and shot these defenceless babies with guns, gives one food for thought.

KOALA MOTHER AND BABY

The youngsters emerge from the pouch at eight months and travel in this way

The use of the land that makes this highly original and interesting work possible was due to the generosity of Mr. T. H. Kelley, Director of the Perpetual Trustee Company of Sydney. He rents the land to Mr. Burnet for a shilling a year. So active is his interest in the experiment that if there is a heavy rainstorm in the night, he will phone up from town to be sure the bears are all right, and when a new baby appears he is full of solicitude. In spite of the generosity of many people it is a continual financial struggle to keep these little lives intact and to add to them. Mr. Burnet has said that many, many baby eucalyptus trees have been lost because when the trees were ready to put in the ground, there was no cash for wiring to put around them; or if the wiring was there there was no cash to hire the necessary labor for transplanting; and many trees that had been nursed through infancy at great cost had to die.

The health of the animals causes another continual battle, the expense of which goes on unseen by the public, which is charged only the most nominal fee for entering this fascinating domain. Yet, thanks to the amazing affection and enthusiasm and intelligence of Mr. Burnet, the most charming little furred animal in all the world survives, and gazes at you with the same sweet little brown eyes with which his ancestors must have gazed from some safe leafy bough at the dinosaur and the giant kangaroo in the days when the world was young.

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BOWER OF THE SATIN BIRD . . . BY KILROY HARRIS

THE "bower building" birds of Australia have been studied by some of the world's most famous naturalists. There are many different kinds, the most familiar being the satin bird of southeastern Australia. The bowers are really playgrounds; the nests are bowl-shaped structures of twigs, sometimes lined with leaves, and have no connection with the bowers.

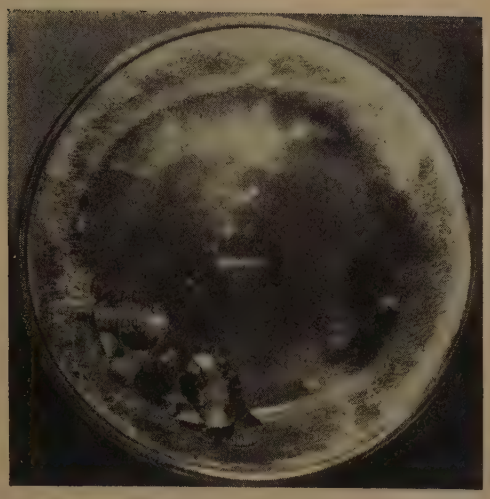
After building the bower, the birds collect bleached bones, small shells, blue parrot feathers, and other bright objects, which they heap around the playground. Any shred of glass or metal which arrests the eye, or reflects the rays of the sun, is a gem in the bowerbird's collection, which seems in a sense to parody the art decorations of a modern home.

Sometimes the bower consists of a passage-way about three feet long, around which the birds place all their play-things. Sometimes they stick the feathers on end. When these curious playing places were first discovered, they were thought to be made by the native aboriginal women for the amusement of their children. More than a bushel of small pieces of bleached bones or shells are often found at one of these curious sporting places. Sometimes a dozen or more birds will assemble, and they delight in chasing each other through the bower, and playing about it. They have a sense of humor, it seems to observers.

A QUEER COCOON

AN EXAMPLE OF INSECT ADJUSTMENT

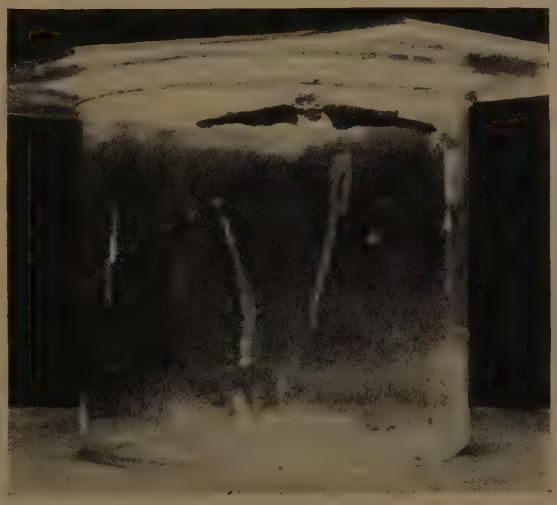
BY ROBERT E. COKER



THE FULLY DEVELOPED MOTH
After six months in a novel cocoon, the perfect adult appeared

ONE day in the Autumn an unknown contributor left on my table a large larva of the Polyphemus moth in a damaged pasteboard box. Finding the larva escaped from the box and crawling over my papers, I placed it in the container most conveniently at hand—a cracked 2-gallon cylindrical glass aquarium jar. A very large piece of window glass was then placed over the top of the aquarium to make sure of retaining the larva until the donor might appear to determine its disposition. But no one came to claim it.

As it turned out, it was the larva that determined the further arrangements. During the day it crawled busily about in its bare and spacious chamber, whether seeking means of exit, surveying its strange environment or obeying some indefinable urge—let us not say which. At any rate, by the following morning the large glass plate had been firmly attached to the aquarium with silk webbing well placed around the angle at the top of the container. In fact, plate and aquarium were securely and firmly united into one assembly, which could be carried about holding by the edges of the plate without danger of rupturing the silken strands.



THE COCOON AND THE TOMB
The white maze at the top marks the careful weaving of the larva to seal its novel home

The larva lay on the bottom with a little dark liquid near its discolored body which, unfortunately, was presumed to be decomposing. We were unaware at the time of the fact that the larva of this species injects into its normally snug and densely woven silk cocoon a quantity of liquid that perhaps makes it more impervious to water. When next observed, a few days later, it was found to be in the form of a perfect chrysalis, with a dark brown skin but otherwise quite naked. So the enormous glass cocoon remained as an object of curiosity, with the pupa fully exposed at different hours to bright daylight, lamplight and darkness.

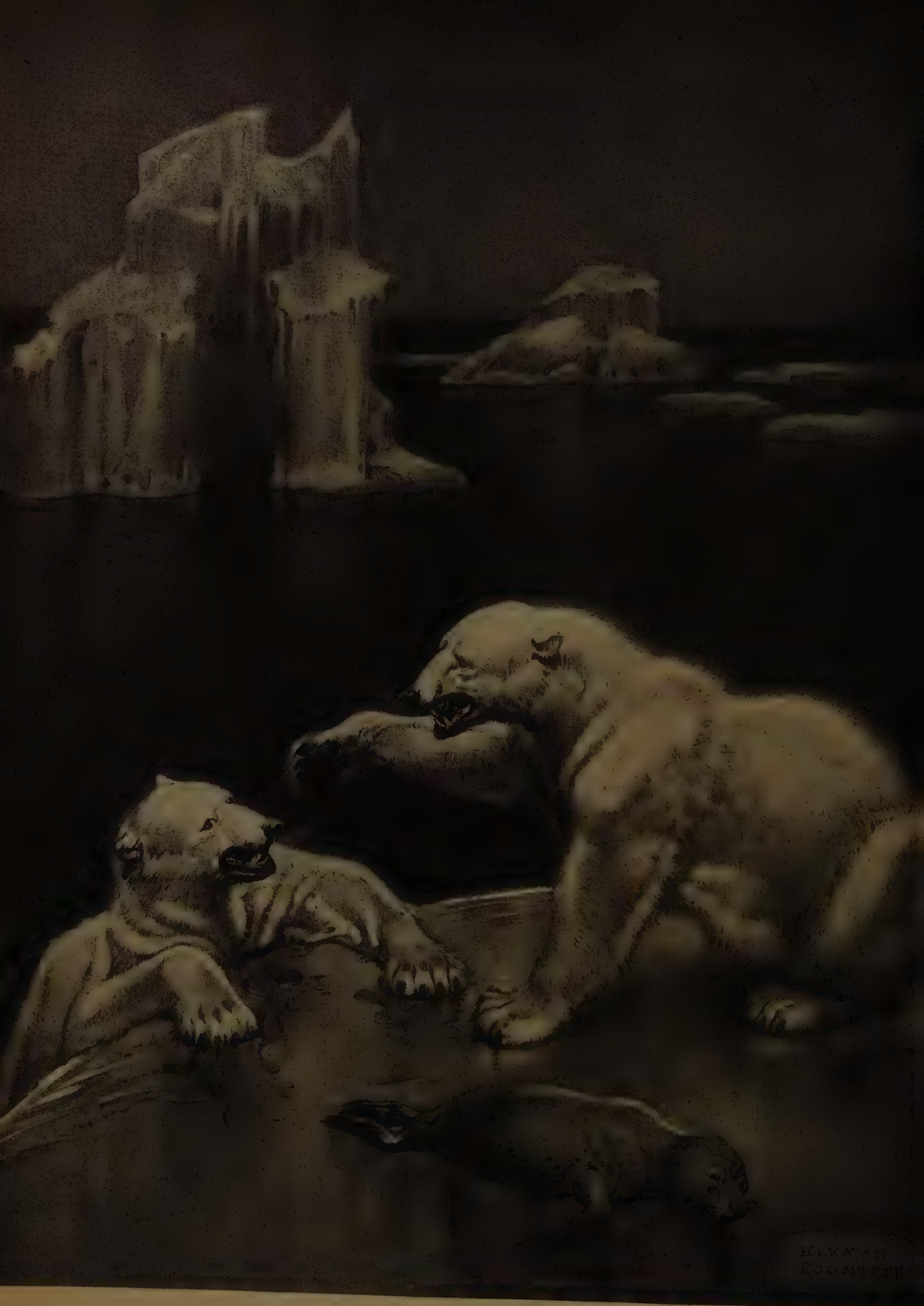
The final surprise came in April of the following year when a large, live male Polyphemus moth was found hanging to the webbing at the rim of the jar, while the empty pupal case lay in two pieces on the bottom. Since the top had never been disconnected from the jar, the moth was, of course, unable to escape from its self-made cocoon, which was now in a fair way to become its tomb unless help came from without.

Some interesting considerations are suggested:

In the first place, the larva, ready for pupating, was confronted with conditions which must have been in some respects without precedent in its racial history. A two-gallon glass jar with heavy glass cover are not ordinary substitutes for a few flexible leaves in the construction of a cocoon. The mere fact of extensive travel while binding together the two parts of the cocoon with secretion from its silk glands —travel over a path 27 inches long about the circumference of the mouth of the jar—would by itself seem to be a feature sufficiently novel.

Yet these conditions were met in fair engineering fashion, with little waste of building material. Webbing was not spread over the top or bottom or over the sides generally. The bottom angle of the cylindrical jar was much like the top angle in appearance, yet no silk was wasted here, although the presence of a few threads attached in spots nearly all around the bottom showed that this angle had been at least canvassed.

Practically the only webbing used that was not obviously requisite to make from the two glass plates a firmly closed compartment was a broad thin track down one side of the jar and a thin carpet over the bottom at and near the spot where the insect finally rested. Assuming they represented pure waste, it is remarkable that the waste should have been so insignificant. As contrasted with the normal, outdoor cocoon, this one had room for half a thousand pupae, was open to daylight, and was in a heated room, yet the moth emerged in perfect form.



IN THE ARCTIC . . .

. . AND THE ANTARCTIC

MRS. CURTIS
A silhouette portrait of the "flower lady"

A PHOTOGRAPHIC HOBBY

MRS. CURTIS COLLECTS PLANTS WITH A CAMERA

BY ESTELLE COBB WHEELER

WHEN Mrs. Alice M. Curtis was a schoolgirl in Gloucester, Massachusetts, she used to mourn over the inadequacy of her treasured plant collection. Dry ferns would break, the colors fade, bugs and insects would eat her prizes. For years, she struggled with the old methods of preservation, but when her son had grown to high-school age and was bringing home more specimens than she could handle, she bethought herself of the camera and began to make a unique plant collection.

As the plants were found, they were instantly photographed on post-card size film, developed at once, and whisked, with the originals, to a color artist, who painted on the prints their correct colors. Thus a permanent, indestructible, and accurate record was created, and now Mrs. Curtis has considerably more than two hundred photographs, most of which are of wild flowers that grow naturally within twenty miles or so of Cape Ann.

The work is far from easy. Oftentimes the flower wilts before the artist can paint its colors, and another trip, or even four or five trips, must be taken before the exact color can be reproduced. If the season is unusually early, the flowers may have blossomed and gone by before they are discovered. Dancing flowers ruin time-exposed films, and the patience required in waiting until they are still equals that of Job.

Frequently some plant exists only in forbidden places. Such was the case of the fringed gentian, the only abode of which in the neighborhood was within a private estate in Essex County. Visitors were not welcome here, but Mrs. Curtis persuaded the owner not only to let her in, but to help in the photographing, and to let her dig up one plant and take it home to the artist. Thus a prize was added to the collection.

The delights of Mrs. Curtis' hobby have grown with the years. Her walks and auto trips into unexplored regions give a thrill she finds impossible to duplicate otherwise. She heartily recommends her avocation as one of the most interesting of all.

Mrs. Curtis is a very busy woman. Her twenty-four hours a day are fully taken up with being a wife, a mother, a good neighbor, a civic leader, and the proprietor of a successful scenic photography business. But she always finds a few hours each day in which to collect, photograph and have painted her beloved plants, and year by year her original collection grows.

Photography is more and more being recognized as the handmaiden of conservation. Hunters are substituting the camera for the gun, and plant lovers may find delight in recording in permanent form the plants they now destroy. One who has once photographed a rare species is a sure convert to its conservation.

THE BEAUTIFUL FRINGED GENTIAN
Diplomacy won this photograph for Mrs. Curtis. Below is a white trillium, one of two hundred plants in her collection

BABY BIRDS AT PLAY

BY MAUD BALLINGTON BOOTH

ILLUSTRATED BY R. BRUCE HORSFALL

Along with her notable work in the field of social reform and improvement, Mrs. Booth has always had an intense interest and love for Nature. That she is likewise a keen observer is revealed in this story that she writes about some of the things she has seen her bird friends do.

IF ONE watches the feathered friends that make our gardens places of joyous life and melody, many interesting incidents reveal to us the personality of different members of these bird families. After watching the home building, the patient nesting mothers, the feeding of the hungry fledglings, there comes, to my thinking, the most interesting period of their lives—when the full-fledged youngsters launch gayly out into a wonderful world. Their wing testing, their questionings and investigations are so like the human child's. Very often they seem so pleased with themselves, so full of fun and so interested in their surroundings.

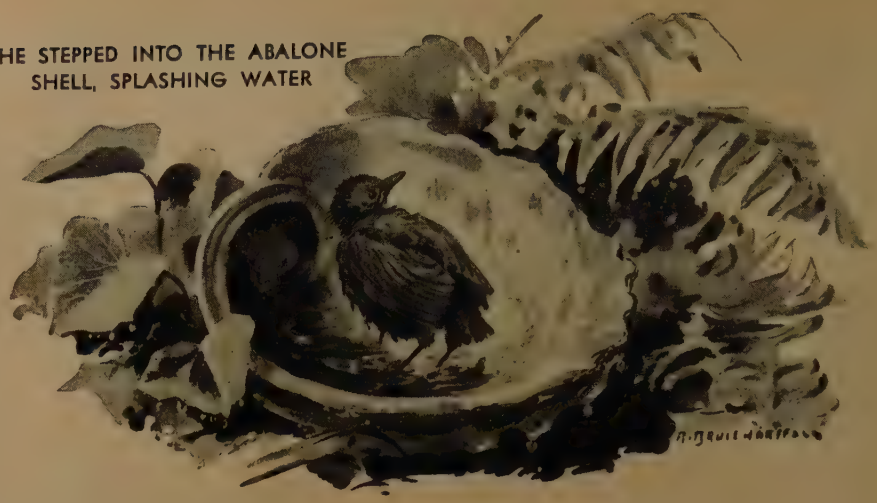
In my Long Island garden I have seen several exhibitions of real playfulness and mischief among these feathered babies. One evening, shortly before sunset, I sat watching my birds. Rain was on the way and there was every evidence of a coming storm. I had placed an extra large gourd for the wrens on the backstop of the tennis court, but they had never built in it, evidently preferring a smaller one nearby. Now the father wren was popping in and out of the bushes, scolding the baby birds quite loudly, while they scurried about among the leaves like little gray mice or fluttered from twig to twig as if they enjoyed making him chase them. As I watched, I realized that he was herding them toward the wire netting on the backstop, and soon the tiny fledglings were hopping and fluttering up the wire like children going upstairs. He flew behind them, scolding and hurrying them. At last he got the first one up to the big empty gourd and shooed it in. Down he went after the next one and chased him up. Another and another followed, but these wren babies were as naughty and mischievous as children can be. Every time he flew down, those already in the nest would pop out and scold and squeak until he had to fly up and chase them all in again. I sat there and laughed until growing darkness helped the distracted little father and at last every one of his family had disappeared into the swinging nest.

I told this incident to a party of guests the next day and they, with my family, jeered at me, assuring me that my imagination played a big part in my bird stories. So that evening, at exactly the same hour, I took them out to watch for themselves. And sure enough, we soon heard my wren in the rose vines! He stood looking at me with his little bright eyes as I whispered to him to get his babies and put them to bed. Then away he flew and for half an hour we watched the scolding and herding and the mischievous antics of the baby birds who evidently wanted to stay up late.

At Long Cove on Fire Island, I have a summer cottage that we use for picnic parties, often spending a night or two over there when we want to get away from mainland noises, telephones and other countless every-day affairs and interruptions. This little house is built on the sand-bar within a stone's throw of the pounding surf. On the west side of it is a gully, beyond which rises a steep sand dune. It is almost swept clear of grass by the wind, and is, therefore, smooth and hard to climb, crumbling away beneath one's feet at each step.

"THEY WERE NOT ATTEMPTING TO FLY, BUT LAUNCHED THEMSELVES ON THEIR LITTLE STOMACHS AND TOBOGGANED DOWN"

One chilly morning in early fall, a friend and I had breakfast in our sunny kitchen. Perhaps we had talked over-long, because the sun was well up when we left the table and went to the sun-porch overlooking this sand dune. We were at once attracted by a great twittering and squealing and noticed a veritable congregation of baby barn swallows clustered on



HE STEPPED INTO THE ABALONE SHELL, SPLASHING WATER

the top of the dune. To our astonishment we saw them start to slide down the steep face of the sand! They were not attempting to fly, but launched themselves on their little stomachs and tobogganed down—just as our children tackle the high hills with their bob-sleds. They must have numbered about forty or fifty, and that it was a rollicking game they were having, no one could doubt who heard their squeals and cries of delight. If they did not advance fast enough, they used their wings as if they were oars to push themselves down. Reaching the bottom, they would start up again to the top by flapping and pushing their wings in the sand in the funniest manner. At the top they would shove and crowd each other, quarrelling over the best positions to start down again. All the time they were as noisy as a pack of school children let out at recess.

We must have watched them very nearly half an hour. They made the queerest little tracks on the sand, reaching from the top of the hill to the bottom. The parent birds did not take any part in the play. They swept back and forth in the gully and away over the dunes, but the babies took no note of them, being utterly absorbed in their new-found game.

The night had been chilly and the particular family of swallows that belonged to my house had all been lined up on my clothes line early in the morning, awaiting their breakfast. After being generously fed by the busy parents, whom I had watched at work near my bedroom window, the babies rose on the wing, attempting to hunt for themselves. I fancy they may have become chilled while flying, and settled down to rest on the sand which the sun had warmed. One or two may have slipped as they jostled for comfortable, sunny places, and thus discovered the pleasurable sensation of sliding in the warm sand. In any event, they found it much fun.

One of my older birds in my Blue Point garden amused me in early spring by a frolic which I had not the heart to disturb, though it was sorely destructive. I heard a most excited and joyous call from a gloriously colored Baltimore oriole. Hurrying out to welcome him, I discovered that he was in my Japanese flowering quince! He was hopping from branch to branch picking off the blossoms and dropping them down. Each time he picked one, he gave a cry of delight and sprang for the next. It was such a sunny fresh spring day and he was so happy and utterly enjoying himself, that I just could not interfere. He went through the bush from top to bottom until every flower blossom lay on the ground like a crimson rug. Someone suggested to me afterwards that he may have been after bugs or caterpillars, but I think not, because he never stopped to examine the flowers or did he swallow anything. His actions were lightning-quick and his joyous cries of delight were not the indications of hunger, but just the bubbling over of fun and spring fever.

For three years this same thing happened, but last year he arrived home very late and my bush was a blaze of fiery glory, lasting many days. I noticed that he never cared anything for two nearby bushes of peach-colored quince blossoms, so I suppose he had a complex for crimson.

There is also a story about one of my baby catbirds. I was sitting on my piazza, close to the bird bath, when I saw one of the young catbirds hopping among the ferns and ivy that surrounded it, anxious to experience his first bath. It was a hot day and he evidently longed for the cold water, but was afraid to venture in. He would put his beak in and then draw back. After many hesitations he caught sight of a large, water-filled Abalone shell, one of several set down amidst the ivy to be used as baths for the tiny birds. He stepped in. In a moment he was flapping and fluttering his wings and letting out shrill squeaks of delight. Exhausting the water supply in the first shell, he hopped out and went into the next, and again was delighted with the new experience.

While he was showering the ferns with water drops and enjoying himself thoroughly, I saw a flash of gray wings and there above him on the rocks perched father catbird with a big raspberry in his beak. The bathing beauty took no notice of him, but continued to flap and scream—having by now reached the third Abalone shell. The father grew impatient and scolded. He hopped nearer and scolded again, but both he and the waiting refreshment were absolutely ignored, while another shell was emptied by the shrieking infant vociferously denying the parental authority.

Then the parent must have used some pretty strong language, for—very reluctantly—the wet birdie hopped out to have the raspberry thrust into his widely opened bill; but the moment it was swallowed he was back in the shells again! He thus emptied five of them and then, having gained confidence, he bravely faced the big bath, which thereafter he happily visited many times a day.

"ON A LOG NEAR THE RIVER BANK A WHOLE TURTLE CLAN WAS DOZING IN THE WARM SUNSHINE"

A WESTERN RIVER TURTLE

BY JEAN W. PETITE

ILLUSTRATIONS BY THE AUTHOR

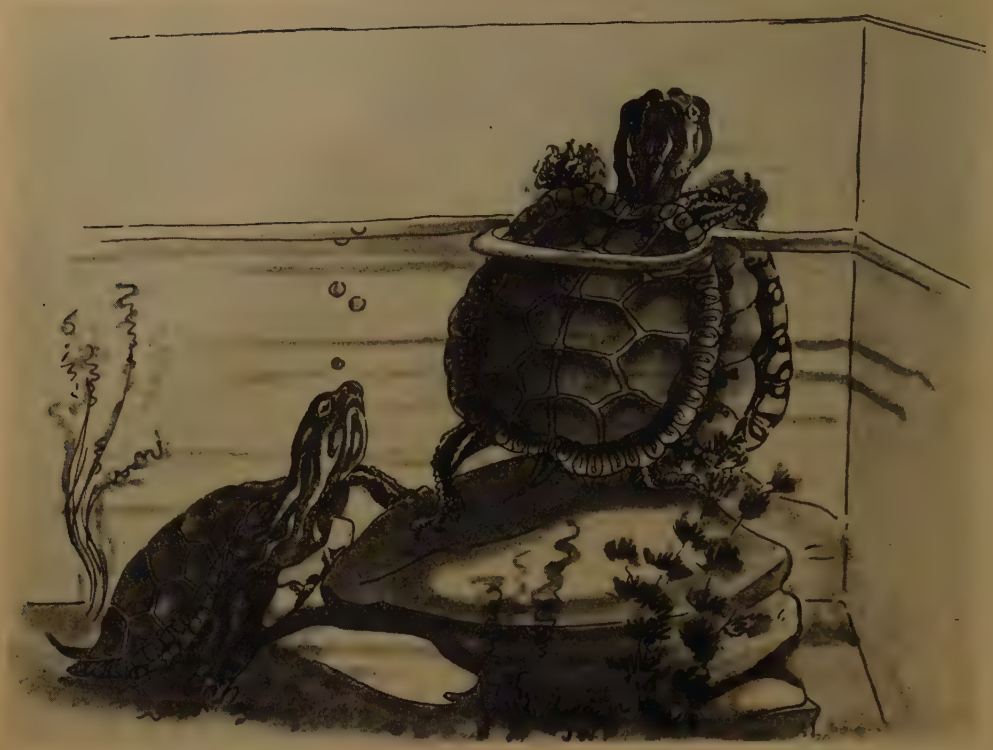
ON A LOG near the river bank a whole turtle clan was dozing in the warm sunshine. Their green backs, grayed by dried mud, blended with their napping place. Indeed, we would never have noticed them when our rowboat passed within a few feet had it not been for the dull little thuds as, one after another, they slipped into the water and paddled swiftly to the safe mud of the bottom.

On the cover of this issue the author pictures the turtle, about which she writes in this story, in color. Scientifically this subject is classified as Chrysemys marginata bellii; popularly it is the species known as Bell's Terrapin. Mrs. Petite is a graduate of Reed College, a Nature lover with an ability to draw, and the mother of three lusty boys, as you will discover when you read her story.

There was vast excitement in the boat because the boys —six, eight and ten as to years—had seen turtles only in aquariums and pools. Here was a whole colony, from wee ones to great grandfathers, close to our camp on the East Fork of the Lewis River in southwestern Washington. And these turtles had chosen a spot where the river bed was sand and mud, and where some old logs had lodged and provided a spot for their siestas.

The discovery of this colony immediately called for several expeditions to bring back a turtle or two. But the dwellers of the river were keen of senses and many attempts at capture ended with empty nets and equally empty hands. Success waited until a fisherman found a young turtle in his crawfish trap. Sadly the little fellow was dead—drowned because he could not leave the trap to go to the surface for air. The boys brought him to camp in a vain attempt to revive him, but all they could achieve was a revived interest in his kind.

We examined the poor little turtle closely. When wet and clean he looked like a celluloid toy. His upper shell, or carapace, was a rich olive-green, with yellow green in the high lights. A rather symmetrical network of irregular yellow lines crossed it, while a central yellow line ran from neck to tail. The lines which separated the hexagonal shields were narrow and black and in several places were obliterated by the yellow lines. Underlying the pattern of the border was a rosy flush of vermillion, becoming brighter at the edges and blending into the color of the undershield. This undershield and the main undershell, or plastron, were firmly united by an immovable bridge that reached from just behind the front legs almost to the hind legs. On this under side Nature had painted a lovely design on a brilliant background of vermillion. Dividing the sections of the plastron were tiny hair lines of black bordered with yellow, and down its center was an almost symmetrical design of rich black with queer insects of lemon yellow and pale vermillion. The bridge that joined the plastron to the undershield



"HE SPENT MORE TIME THAN EVER IN STARING AT HIS IMAGE IN THE GLASS SIDES OF THE BOWL. HE WAS LONESOME, NO DOUBT, BUT HE MIGHT WELL HAVE BEEN ADMIRING HIS NEAT, BRIGHT APPEARANCE"

of the carapace was striped with green, yellow, and vermillion on black. Along the edge of the undershield was a series of designs, black striped with color, looking like pairs of eyes as the turtle was turned on its side.

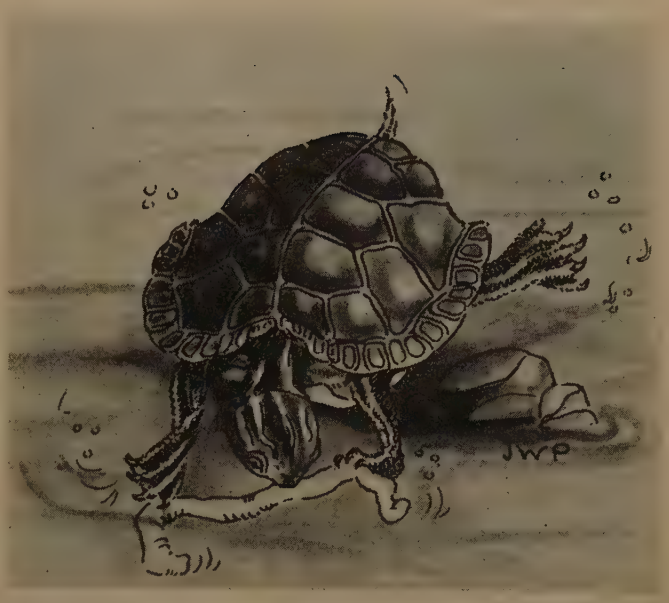
The design on the skin of the head and legs was striking as well. Running lengthwise on the rich dark green on the back of the head, were fine lines of yellow. From behind the bulging eyes the lines became broad and were tinged with vermillion. Under the jaws and throat the yellow lines were wide and close together so that there were narrow lines of green between them. The nostrils were tiny black dots in the little pointed nose; the mouth a narrow gray line, almost unnoticeable among the pattern lines in this lifeless specimen. The skin of the neck hung loosely, and halfway between the nose and shoulders was the deep crosswise fold which had enabled him to stretch out his neck or to draw it in at will. The black skin of the legs, lined and dotted with yellow, was of a coarser texture than the head and neck—more like snake skin. All five front toes and four of the back ones had sharp claws. The front feet were but slightly webbed, while the very efficient webs on the hind feet looked like narrow yellow ruffles between the black toes.

None of us had known that turtles could be so attractive. In fact, I felt that I must make some detailed sketches, so we decided to make another attempt to capture one or two. Donning bathing suits, Daddy and I set out. We left our boat some distance upshore and slipped down the bank to the turtle rendezvous. The last of them slipped off the log as we approached. Wading in, we "froze" between the log and willow limbs. Those long minutes of waiting were full of interest. After the mud settled, the water became alive. Dozens of orange brown salamanders came crowding around us, minnows played tag about the submerged limbs, tiny water creatures crossed the patch of sunlit water, and myriad skippers and other insects floated downstream with the current.

As we watched, a green and yellow head appeared, and a turtle came to the top. A finger stretched to point him out and he turned without waiting for his breath of air, swimming out of sight with great speed. Soon others ventured up. Their movement upward could scarcely be called motion—they seemed really to float up, with occasional paddles to direct them. When their keen little eyes and ears told them of strangers, however, they were all swift motion. Their descent was a mad scramble, awkward but effective. Since we could not dive in among the willows to follow one, there was nothing to do but keep perfectly still until one came near us. Meanwhile we studied these queer little reptiles. They ranged in size from an inch in length to perhaps eight inches, the smaller ones smoother and brighter than the old ones. As they grew larger the carapace became more curved to allow room for the growing body. The irregular yellow lines across the carapace became more indistinct on the medium sized turtles, and were practically lost on the larger ones. The hexagonal shields became much more distinct with age. On the vermillion undershield and plastron of the oldsters the black figures were blurred along the edges so the pattern did not stand out distinctly, but took on a soft velvety appearance. The heads, with their peering, inquisitive little eyes, and the legs, were richer in color in the older turtles.

There was a pushing near my right foot, and without turning my head I looked down to see a bright head and neck pushing out of the drab mud. I squatted slowly, my hand back out of range of the eyes, and picked the little

"TAKING FIRM HOLD WITH HIS TINY JAWS AND TEARING THE ENDS AWAY WITH THE SHARP CLAWS OF HIS HANDS"



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turtle out of the mud. Unlike mud turtles, these make no snapping motion and are perfectly harmless. This one wished to be back in the water, of course, and pushed and pushed at my hand with his tiny feet—feet that act like hands much of the time. Soon Daddy caught one as it came out from under the log, and then another, as it rested one arm over a limb, its nose out of water. Now we had one for each of our boys, and since it was time for our afternoon swim, we hurried back to camp and put the three lovely turtles in a deep pan half full of water.

In a few days the new pets were made comfortable for the two-hundred mile drive to Seattle. There the boys made a new home for them. In a big tub in the back yard they put water, rocks, and floating bark. The turtles were still shy, and, when approached closely, ducked to the bottom of the tub to hide under a big clam shell or the bark. For the first few days they refused food, but they soon became hungry and ate tiny pieces of meat held close to their noses on the ends of toothpicks. They were interesting little fellows, more active than we had supposed turtles would be, and all the children roundabout came to admire and watch them. One day the rocks were piled against the side of the tub and the largest one, two and one half inches in length, climbed up, out, and away. Middle sized turtle was caught just as he was going over the top. It was dusk, and though the boys hunted carefully they could not find the runaway. The other two seemed fairly contented in the big tub, basking out on the rocks as long as the sun shone on them, although they did try to climb the sides occasionally. When they could be watched, they were set loose to roam about the yard. Small pieces of meat satisfied their hunger until one day the boys gave them an earthworm. After that they would not touch the meat, but seemed to prefer to hunt their meals. They stalked those worms that were dropped into their tub like a cat after a mouse. We often put them into a big glass bowl so we could watch them closely. After circling around and sniffing the wriggling worm, one of the turtles would pounce upon it, taking firm hold of it with his tiny jaws and tearing the ends away with the sharp claws of his hands. His hind feet were usually flying in the air with his exertions. After the long ends of the unhappy worm were torn away, the middle was swallowed with a big gulp, and the ends soon followed. One worm was usually sufficient for one turtle for the day. The boys tried to tempt their pets with earwigs, grubs, flies, lettuce—all the food that was on record as pleasing to them, but with the exception of flying ants, for which they showed a strong liking, angleworms continued to be their chief diet.

Since our boys are inveterate traders, middle sized turtle became the property of a boy down the street, and the small one, one and one half inches long, was left alone. We did not dare put him in with the goldfish for fear they would lose their tails, but we often put him into the aquarium alone, and he spent more time than ever in staring at his image in the glass sides of the bowl. He was lonesome, no doubt, but he might well have been admiring his neat, bright appearance. The markings on his legs were so placed that he seemed to be wearing the black lace mitts of our grandmothers' day on his forelegs, or arms. From the rear his hind legs seemed to be encased in tight striped pants. His sharp little eyes, looking like black shoebuttons in narrow buttonhole slits, followed us inquisitively whenever we went near him. He became accustomed to the ordinary sounds about the house and often dozed with his head almost hidden under his shell, but the moment there was an unusual noise—the bark of a dog, an auto siren, or the drum of an airplane motor, his head shot out on his long neck and he peered anxiously about. Until the cold weather set in, he sought the

"HE DUCKED TO THE BOTTOM OF THE TUB TO HIDE UNDER A BIG CLAM SHELL"

sunny spots, whether in tub or aquarium. He liked best to climb upon a short floating limb and crawl about until it balanced just right. When he slept at night his head was always tipped up so that his nose was just out of water. Then he seemed to reach a semi-dormant stage, and, since the nights were often freezing, we brought him inside to the aquarium. We kept his water cold by frequent changing. While he still seemed to enjoy having his head stroked gently and was active at times, he avoided the light and spent much of his time under the big clam shell. He ate seldom and slept at the bottom of the water, his head drawn close to his shell, his legs stretched out at full length. So he dozed the winter through, and, not long ago our boys returned him to his brothers and sisters back in Lewis River. There, perhaps, we may see him on other summer days that are coming.

LADY OF THE EAST COAST SHORE LINE

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THE GRACEFUL TREE GROWS RAPIDLY

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THE WHITE BIRCH

BY L. W. BROWNELL

PHOTOGRAPH BY THE AUTHOR

"THE MOST lady-like of trees" is the title given by the poet to the white birch, and surely it is an apt designation, for the daintiness and delicacy of outline of this tree is strikingly feminine. With its shining white bark and shining, delicately-shaped leaves which constantly flutter on their long stems, it can be compared only to a beautifully-gowned and modest woman of surpassing grace.

The white birch is the smallest and least widely distributed of the birches of eastern North America. It is rarely more than forty feet high, and its trunk seldom becomes greater than eighteen inches in diameter. Its branches often clothe the stem nearly to the ground with their slender lengths, and their ends divide into numerous dark-brown, wiry branchlets on which the leaves, in fall, are a shower of gold.

The range of this beauty extends from Nova Scotia, New Brunswick and the lower St. Lawrence valley southward to Delaware, and westward through New England and New York to the southern shores of Lake Ontario. At no place is it found far inland from the coast. It occasionally rises to an altitude of eighteen hundred feet above the sea, but is rather rare and local in the interior.

The flowers appear in late March or early April when the leaves are beginning to unfold. Both staminate and pistillate are borne on the same tree, the former growing on drooping catkins from two and one half to four inches long, and the latter appearing on the short twigs that bear the leaves. The staminate flowers are formed a season before the pistillate, and at maturity are brownish yellow in color. The light brown seeds appear in small upright cones on the end of the twigs previously occupied by the pistillate blossom. They are about a twelfth of an inch in length, and equipped with a pair of wings that are about as wide as the nutlet itself. They frequently remain in the cones until well into the winter before being distributed.

The dull, chalky-white bark with its orange inner surface is about one-eighth of an inch in thickness and will separate into layers with a little urging, but not so readily as does that of the canoe or paper birch. At the base of the trunk the bark is thicker, nearly black, and broken by shallow fissures. One of the characteristics of this tree is the dark, triangular spots which occur on the surface wherever a branch or bough appears and which persist after they have fallen away.

The white birch is short-lived, and its flexible trunk, which is often bent almost to the ground in the winter by snow and ice, makes it undesirable as an ornamental. Its wood used to be valuable only for spools, shoe pegs and barrel hoops, but recently the wood pulp factories have made demands for it. It grows rapidly, and almost as soon as a grove is cut, new shoots spring up from each stump and from scattered seed, covering the ground in a few years with another forest of this graceful tree.

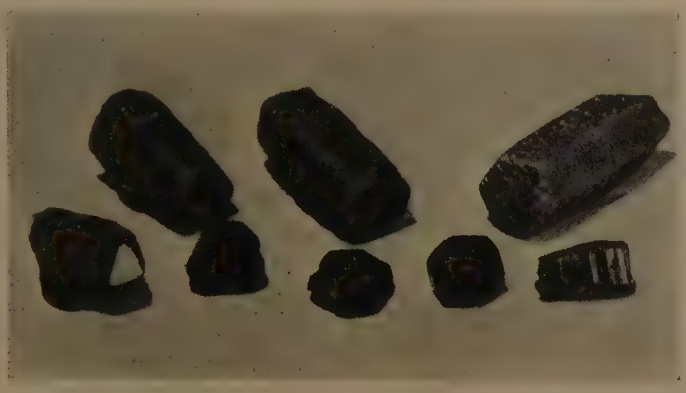
THE RUBY STANDS FOR LOVE

JULY HAS FOR HER OWN THIS PRINCE OF GEMS

BY AUGUST POHNDORF, JR.

The marvellous Ruby with its host of magical properties forms the subject for the seventh article on birthstones by Mr. Pohndorf. The Sardonyx and Peridot, gems for August, will be discussed next month.

THERE is a philosophy somewhat followed today which states that each object of matter acquires on its surface a complete record of all that takes place in sight of it, much in the manner of a film exposed in a camera. If such be true, and the secret key to the record could be found, what would the rubies reveal! The pageant and pomp of the Eastern courts, where they reigned as favorites; endless struggles, bloodshed and sins for their possession; the course of history changed because of them, the wild greedy schemings of men and women who longed to look in their sanguine depths.



RUBIES IN THE ROUGH

Made in Nature's Laboratory, they have frequently changed the course of history

A drop of blood has been shed, in all probability, for each blood-like gleam from the surfaces of these precious stones. And to think that they are nothing but a little oxygen, such as we breathe, a bit of aluminum, tons of which were used in building the new Akron, and a trace of chromium, a substance that any painter carries in large amounts. But their secret is that they were mixed in Nature's laboratory!

Rubies are flat, tabular, hexagonal crystals or rounded, water-worn fragments of corundum, the sesquioxide of aluminum. They are only slightly softer than sapphires, the second hardest stones, and are graded at 8.8. Their luster is adamantine, but not of the same degree as the diamond, and although their index of refraction is only 1.769 at best, some rubies exhibit flashes of internal fire that gleam as if the stones were consuming themselves from within. Other translucent stones, when cut as carbuncles with the base left unpolished, show a perfect six-rayed star that travels swiftly over the surface as the stone is turned, and never is lost to sight. These are called star rubies. The gems radiate two colors, and are doubly refractive—that is, they reflect light in two planes instead of one. They are among the heaviest of stones, with a specific gravity of about 4, and are exceeded in this respect only by zircons and some garnets. They are infusible, and insoluble in acids.

The luminescent property of the ruby has given rise to many legends, the best of which, from Greece, deals with Heraclea and a lame stork to which she had been very kind. To show his appreciation, he placed in her lap a ruby of such surpassing brilliancy that she used it to light up her room at night.

According to Persian and Arabic tradition, the ruby, taken internally, was a cure of cholera, epilepsy and insanity. Among the Hindoos it was considered to bring health, wisdom, wealth and happiness. Sir S. M. Tagore, the Indian, writes in *Mani-Mala,* "The Chain of Gems": "The man who keeps in his house a sterling padmaraja (a nonpareil ruby) can with perfect safety live in the midst of his enemies and is impervious to the attacks of adverse fortune." In his book, *Travels,* Sir Jerome Horsey, who lived about 1580, quotes the Russian Emperor, Ivan the Terrible, as follows: "Poynts at the ruby, 'O! this is the most comfortable to the hart, braine, vigor & memorie of man, clarifies congelled and corrupt bloud.' "

MADE INTO ORNAMENTS

The ruby is susceptible of various uses as a gem for adornment of finger or neck

Among the Europeans of the Middle Ages it was considered to strengthen

the mind and memory, bring joy and divert the mind from sadness. It was supposed to turn white when peril threatened its wearer, and regain its color when the danger had passed. All these beliefs, however, have disappeared. The only conception the cynical modern has regarding the gem is that if left a sufficient number of them, poverty would disappear like mist before the sun.

The best stones come from a territory about twenty-five or thirty square miles in Upper Burma, north of Mandalay, and their presence was responsible for one of the former titles of the Burman kings, "Lords of the Rubies". These kings granted royal licenses to mine rubies and under pain of severe penalties demanded that all large stones be, without remuneration, turned over to them. The temptation to the miner is obvious—he either forgot he found a large stone or he broke it up into bits.

A Burman ruby of four hundred carats—a veritable house cat in a land of ants—is mentioned in G. F. Herbert Smith's *Gemstones*. This stone, he writes, was broken into three pieces, two of which were cut into gems weighing seventy and forty-five carats each, and the third was sold uncut in Calcutta for seven lakhs of rupees, or nearly fifty thousand pounds. The cut stones were worth probably $125,000 and $60,000 respectively. A wonderful stone of 304 carats was found in Burma in 1890.

Fine gems are also found in the gravels of the Irrawaddy River and in the crystalline limestone hills of Sagyin, about sixteen miles from Mandalay. Other sources are Afghanistan, Siam, Ceylon, Australia, Asia Minor and Clay, Jackson, and Macon Counties, North Carolina.

Through the centuries the ruby has been emblematic of love. Those born in July, therefore, may wear as their stone the gem dedicated by the ancients to Venus, to express both their birth month and their affections.

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A CLAPPER RAIL QUEST

CHASING A SHY BIRD WITH A CAMERA

BY JOHN BARTRAM

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CAUGHT AT HOME AT LAST!
Only after many discouragements was the clapper rail finally photographed

THE clapper rail is as elusive as the proverbial needle. Her nest was found by chance in the salt marshes near some laughing gulls we were photographing. It contained five eggs but no bird—she had sneaked away through the grass at our approach. She was so shy that she would not face the unprotected camera which was set up near the nest even when I attached a thread to the shutter and retired some seventy-five yards with it to fight mosquitoes and wait.

The best picture she would allow was that of her eggs, and even that one was fortunately timed, for later in the afternoon two of the eggs were gone! And some time during the night the other ones disappeared. And still no bird.

All the next day she eluded our search. Just as we were about to give up the hunt we came upon the eggs again; or at any rate, another nest with five eggs in it. It seemed impossible that the rail had trundled the eggs from the former nest to their present cradle; and the fact probably was that the others had hatched and the young slipped away, while we had now discovered a new batch. But still there was no bird!

Determined to film her at all costs, we set up the camera, as a compromise to modesty, within a blind. We kept careful eyes on the eggs to see that they did not disappear again. The wait began. But it was only a few minutes before the bird returned, stealing through the grass. She inspected the blind, turned the eggs over and settled down to incubate them. When the camera clicked she disappeared, and by this time we had become so impressed with her elusive qualities that we were almost prepared to see the eggs follow her!

THEY LIVE IN WATER CONSTANTLY AROUND 110 DEGREES, FAHRENHEIT

These are the little hot water fishes of Tecopa Hot Pool. The lighter ones are the adult males and the darker the females

HOT WATER FISHES OF THE DESERT

FINNY FELLOWS THAT SWIM WHERE MAN WOULD SCALD

BY JOHN EDWIN HOGG

A FISH, they tell us, is a cold-blooded, vertebrate animal possessing permanent gills, and whose natural habitat is water. The same dictionaries inform us that a cold-blooded creature is one whose blood temperature is that of his environment, usually less than 90 degrees (F.). We know that many species of fishes habitually live and thrive in water barely above the freezing point, and that innumerable fishes of the tropics find life at its best in water warmed by a torrid sun to temperatures of 90 degrees or slightly more.

This leaves us a bit confused, perhaps, when we observe certain fishes inhabiting natural hot pools. They are true fishes. They are cold-blooded within the biological definition of the term, even though they often live in water so hot that no warm-blooded animal could take a bath in it without disastrous consequences. The temperature of the water is the blood temperature of these fishes, and any human being whose blood temperature mounted to a similar degree would be instantly stricken with a fatal fever.

FISHING AT TECOPA SPRING

The picture gives a good idea of the barren surrounding country

While such hot pool fishes are known to exist in many parts of the world, perhaps the most interesting groups of them are those to be found in some of the naturally-heated waterholes of our western deserts, so-called. It seems strange to think of fishes living in water that would actually scald a human being. And it seems equally strange that such fishes, spending their lives literally "in hot water", should also be residents of some of this continent's most arid and next-to-waterless wastelands.

Some years ago I visited a series of natural hot springs about one hundred miles

SPECIMENS OF LUCANIA BROWNI
These would suffer a chill in water colder than 128 degrees. The man pictured is holding a bottle full of quite hot water

north of Elko, Nevada. It was in mid-winter and the air temperature was several degrees below zero. Yet, out of the ground between the snowbanks bubbled a number of springs hot enough quickly to boil an egg. My hands were numb with the cold. I removed my mittens, squatted at the edge of a stream flowing from one of the hot pools, and held my aching fingers close to the water to absorb some of the welcome warmth.

Mirabile dictu! As I gazed down into the clear water between the swirling clouds of vapor I beheld a number of small fishes swimming contentedly to and fro. "Fishes living in boiling water!" I exclaimed aloud. "Impossible!" I assured myself. Yet, there were the fishes. I could scarcely doubt the evidence of my own eyes. Then, I bolted to my outfit and dug out a thermometer, a laboratory type of instrument capable of recording temperatures well above the boiling point.

Securing the thermometer to a long stick, I took the temperature of the water at the surface. It was 204 degrees. After lowering and raising the thermometer a number of times and at different points, I came to the conclusion that the water along the bottom of the stream was approximately 120 degrees. The hottest water, being expanded and relatively lighter, was all near the surface, this range allowing the fishes to select a temperature best suited to their own physical comfort. Later I learned that these fishes are killifishes of the genus *Lucania.*

On another desert trip in the Death Valley region I found the small killifishes, *Cyprinodon macularius,* that abound in Saratoga Spring, in the extreme southern end of Death Valley. Later I told of these fishes to various groups of desert devotees in and about Los Angeles, only to be laughed right out of the conversation. The very thought of fishes in Death Valley, one of this continent's most infamous deserts, was received like a tale of monkeys, parrots, and cockatoos on the ice floes of the Arctic Ocean.

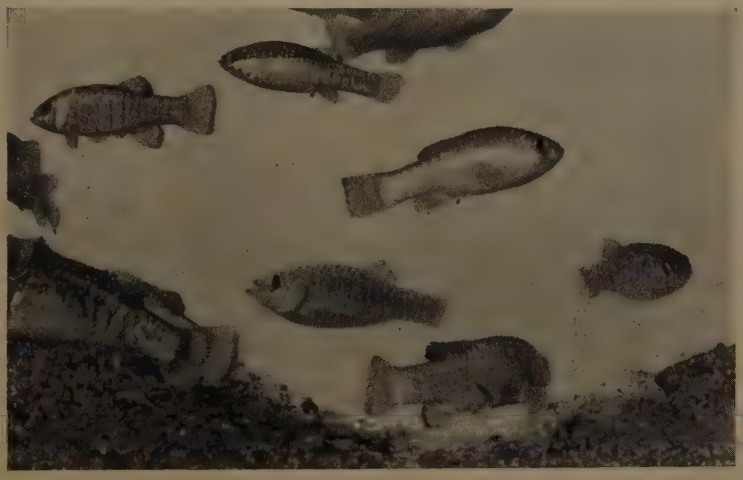
But I knew the Death Valley fishes were there and I now know others who have seen them. And, as these lines are written, twenty-five specimens of them are living in an aquarium in my home, where they have thrived for more than a year. Scientific men have also taken cognizance of them and account for their presence in Death Valley by the fact that they have evidently survived in Saratoga Spring from some remote geological age when the conditions of climate and drainage in that region were altogether different. These fishes, however, live in water of a perfectly normal temperature for the maintenance of fish life and would have no place in this

CATCHING SPECIMENS IN MEXICO
Fishing in "The Hot Spring of the Little Fishes." Corn meal is used to bait them

article except as they serve to point out how fishes are to be found in a desert area—about the last place on earth anyone would normally expect fish life to exist. So, having observed the Death Valley species, we are partially prepared for the surprise that awaits us when we discover the fishes living in Tecopa Hot Spring, some forty miles to the east and slightly north of Saratoga Spring.

The Tecopa Hot Spring is about a quarter of a mile east of the line of the Tonopah & Tidewater Railway, and about six miles south of the desert trading post at Shoshone. It provides a convenient watering place for locomotives, and with water that requires considerably less heating for conversion into steam. The surrounding country is an appallingly arid waste. Yet, in the very midst of a piece of terrain that is mostly a snow-white alkali plain, dotted here and there with gnarled malpais buttes, we find a tremendous hot spring bubbling out of the bare rocks. Two huge streams gurgle from under the base of a malpais hill at a temperature so hot that anyone attempting to bathe in them near their source would be badly scalded. The two streams drop very rapidly, however, down a series of cascades, and some yards below converge into a pool about fifteen feet in diameter and four feet deep. By the time the water reaches this pool enough of the heat has been dissipated to keep the pool at a temperature of from 110 to 115 degrees the year around.

A SCENE IN MEXICO'S DESERT OF THE CHINAMEN
Just about the last place where one would expect to find fish but here the little fellows live in hot water



CLOSE-UPS OF LUCANIA BROWNI
These fishes photographed in their small aquarium are approximately two thirds their natural size. Below, the marsh where the Death Valley fish live

Here is an ideal hot bath in water so heavily charged with borax that soap is superfluous, and since baths are so rarely obtainable in the desert country, practically every traveler passing through this region makes for the Tecopa Hot Spring to revel in its famous bathing pool. Since the spring contains potable water, the Federal government has designated it as a desert water hole, which must forever remain public property. The first knowledge that there are fishes

A LARGE MALE OF THE DEATH VALLEY FISH
The picture shows the fish about twice its actual size. It is closely related to the hot spring fishes

in this torrid water usually comes after the bather has disrobed and made his way into the pool. The shock of getting into such a sizzling bath usually occupies one's attention for the first minute or two. Then the bather becomes aware of numerous tiny creatures nibbling at his fingers and toes. Suspecting leeches, or something equally unpleasant, he is usually much surprised to find that the nibblers are dozens of little fishes whose nibbling is quite harmless and apparently inspired by nothing other than piscatorial curiosity.

The bathing pool, the hot streams flowing from it and the surrounding warm marshlands fed by the overflow teem with these little fishes. If one has a small hand net and the necessary agility, he will find them similar in appearance to the Death Valley species, *Cyprinodon macularius*. The Tecopa fishes have been tentatively classified as *Cyprinodon macularius baileyi*. In size and shape they are identical with the Saratoga Spring species, but their coloring is different. The adult males of the Death Valley species are a deep, iridescent, electric blue. The females are slightly lighter with barred markings on the sides similar to the markings of a rainbow trout. The Tecopa fishes are much lighter, the adult males being what might be described as a "minnow silver", with only a trace of barred, darker markings. The females are a deep olive, or moss green, with barred markings of a considerably deeper hue. The immature specimens are all a pale olive green, and the sex cannot be determined except by dissection.

These little fishes have an amazing physical energy and speed. They dart about at such a rate that the human eye cannot follow them. Yet, they are quite easily caught if one merely takes advantage of their own mad haste. After finding it difficult to catch a few specimens for study and photographic purposes with a small hand net, I spread a piece of mosquito netting across the outlet from the bathing pool. I then beat up a length of the stream below with a stick, and every fish in that area promptly dived into the net. Only a few managed to escape when the net was lifted from the water.

While these hot pool fishes would make interesting aquarium specimens, it is doubtful if many aquarists would care to bother with the heating problems involved in any hopeful attempt to maintain them in aquaria. Aquarists who find difficulty in keeping water at a temperature of 80 to 85 degrees for the many popular species of tropical toy fishes would undoubtedly throw up their hands in despair at the thought of trying to keep an aquarium at from 110 to 115 degrees. Such an aquarium would have to be artificially heated even during the hottest weather.

Nevertheless, such hot pool aquaria have been maintained successfully. In San Francisco I visited one of the largest aquariums on the Pacific Coast, and was there shown a tank containing specimens of a small killifish known as *Lucania browni*, fishes that would suffer a fatal chill in water colder than 128 degrees! They are natives of a desert hot pool near *La Laguna Salada* in the northern part of Mexico's Baja California.

Seeing these fishes in the San Francisco aquarium in water maintained at 128 degrees by a thermostat-controlled electric heater aroused in me a desire to visit the pool from whence they came. The aquarium people did not know the exact location of the pool. At last, a letter addressed to the United States Bureau of Fisheries brought the desired information, together with a reference to the ichthyological works of the late Dr. David Starr Jordan.

With the hot pool definitely located on the map of Mexico, I had little difficulty in finding it while on a recent motor trip from Los Angeles down the great peninsula of Baja California. It is at the foot of the gnarled Cocopah Range, a few miles east of the great Salt Lake—*La Laguna Salada*—and in the northern part of Mexico's notorious *Desierto de los Chinos*—Desert of the Chinamen—which derives its name from the fate of a party of 46 Chinese who perished from thirst while attempting to walk from San Felipe to Mexicali in August, 1902. The Mexicans call this spring *El Pozo Caliente de los Pescados Pequeños*, or "The Hot Spring of the Little Fishes".

Within several hundred yards of this spring any logical person would undoubtedly wager that the nearest native habitat of fishes would be the waters of the Gulf of California, some 40 miles distant. But as one ap-

proaches the spring the first indication of the presence of water is a luxuriant growth of mesquite trees and marsh reeds in a small depression not seen from a distance. Down among the mesquite and reeds is a small pond some forty feet in diameter and four or five feet deep. The water throughout this pool is at a temperature of from 128 degrees to 136 degrees. The pool teems with the tiny fishes, *Lucania browni,* which were so named by Dr. Jordan for Herbert Brown, of Tucson, Arizona, who brought them to the attention of science in 1908.

In appearance these little hot pool killifishes are identical with those of the Tecopa Hot Spring, except for being slightly smaller. The largest of them are the gravid females, which attain a maximum length of 1½ inches. Like the Tecopa Hot Pool fishes *Lucania browni* is also incredibly fast in its movements. The pool in which the fishes live is full of insect life, much of which is their natural food. The water is heavily charged with sulphur and possesses a heavy aroma that suggests bad eggs. Much of the surface of the pool is coated with heavy layers of green and sulphur colored algae, and under this algae the hottest water temperatures are found. I took numerous thermometer readings through all parts of the pool, and found that the bottom temperatures averaged around 128 to 132 degrees. Near the surface the average temperature was 134 degrees, while numerous readings taken under the algae revealed the high temperature of 136 degrees.

When we find fishes living in water as hot as many of us prefer our tea or coffee we have seen one of the most vivid illustrations of how Nature adapts her creatures to strange environments. A trout liberated into the pool of *El Pozo de los Pescados Pequeños* would undoubtedly be killed very quickly. And, certainly, any human being attempting to swim in it would be badly scalded. How then do these little fishes survive? Why are they not thoroughly boiled little fishes?

The only logical explanation seems to be that the hot pool fishes took up their abode in these desert springs perhaps tens of thousands of years ago when the water was of a normal temperature. Then, perhaps, conditions of climate and drainage in those regions were altogether different from what they are today. Down through the ages and countless generations of fishes, the conditions changed and the water became warmer. These changes were undoubtedly so gradual that the various generations of fishes were wholly unaware of it. We now find these fishes living in water that is a hot bath for the average human being, or so hot no one dares bathe in it. It would be interesting to know if elsewhere in the world fishes are to be found living in even hotter water than that of *El Pozo Caliente de los Pescados Pequeños?*

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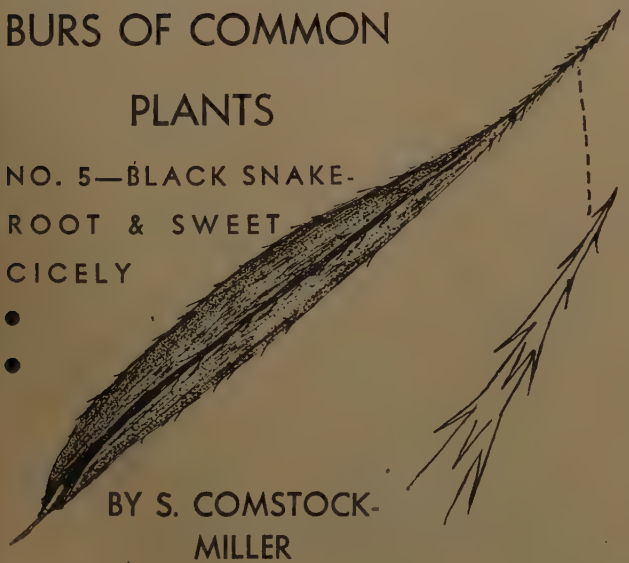
BURS OF COMMON PLANTS

NO. 5—BLACK SNAKEROOT & SWEET CICELY



BY S. COMSTOCK-MILLER

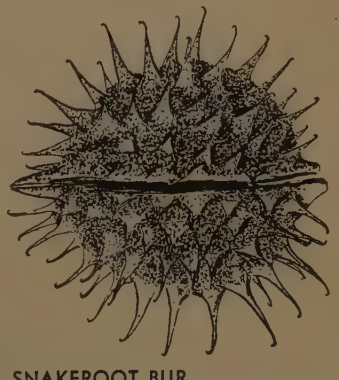
BLACK snakeroot, or sanicle, and sweet cicely are both members of the parsley family, and their burs are often unwelcome riders on our garments. These plants are rather similar in general appearance; but in black snakeroot the leaves are formed of several undivided leaflets, all joined to the leaf stem at nearly the same point, while in the other plant the leaflets are divided into sections. In both plants the seeds are produced on the ends of much-divided stems. Remember these facts.

THE BUR OF SWEET CICELY

Showing, also, a detail of the barbed hooks on the pointed end. It is about seven-eighths of an inch long

The seeds themselves, however, are very different in appearance. The snakeroot bur is ordinarily two-seeded and round, with hooks projecting in all directions, although sometimes it divides into two one-seeded burs, each having a flat side destitute of barbs.

Sweet cicely has a very long slender bur, extending into a sharp needle-like point upon which are numerous backward-pointing barbs. In direct contrast to black snakeroot, the burs of sweet cicely are not found double after being detached from the plant; when ripe, however, they ordinarily divide into two burs, each with a single seed. They are frequently seen clinging to the stem at maturity, united with their twin at the one small point where both join the parent plant. Both sanicle and sweet cicely have a wide distribution, thanks to their equipment.



SNAKEROOT BUR

It is two-seeded, and the hooks project in all directions

NIGHT-SINGERS BOTH

The great horned owl furnishes the wildest music of all the owls, while the mockingbird is the most versatile evening chorister

BIRDS THAT SING AT NIGHT

BY GORDON WILSON

NIGHT-SINGING birds have an allure not possessed by the daytime concerteers, and of course, folk-lore and superstition have accorded them an influence in the affairs of men hardly in keeping with the truth. For several years, I have been studying these nocturnal songsters and most pleasurable have been the midnight hours spent listening to some vigorous-throated bit of feathers whose dulcet or mournful cry filled the darkness.

For a number of nights, one time, I timed the beginning of a whippoorwill's song in a wood near Bloomington, Indiana. Night after night it regularly commenced at seven o'clock; as regularly, in fact as the University chimes told the hour. This was equally true in the years 1914 and 1915. At other places I have noted the same regularity about the beginning of its song. The chuck-will's-widow has not shown the fondness for a definite time to begin its singing, and I have even heard its voice after sunrise and long before dark in the afternoon. Owls are best as singers, in my experience, in the great forests at the mouth of the Ohio River. Usually they are loudest and most daring just after intense darkness has settled over the bottoms. The barred and the great horned furnish the wildest music, but I have also heard the short-eared and the screech owls while the grand concerts were going on. The screech owl, however, prefers a quiet place where the full effect of its mournful wail may be felt. I have always imagined it enjoyed the terror it inspired in the half-awake, nervous listener.

More mournful than the screech owl's hoot is the night-song of the yellow-billed cuckoo in the same great bottoms of the Mississippi and Ohio rivers. It has there a melancholy I have never heard elsewhere, and punctuates its wild lament with its usual daytime calls. At all hours of the night it utters its heartbreaking dirge in a sort of half-cry, half-sob.

The mockingbird is the night singer *par excellence* in the South. I can think of nothing this side of Europe and its nightingale to compare with it. Not contented with its day song, it devises new effects and trills which are distinctly novel and not merely the result of the stillness and suggestiveness of the night. The mockingbird is always the conscious artist, unlike its cousin, the brown thrasher, which sings with abandon; and it is even more the artist at night. With a realization, let us suppose, of the witchery of the time, it frames its song to grip the hearer, to drive away all suggestion of earthiness, to transport one to strange, fairy realms. It has no seeming preference for different hours, and thrills the night at all times. Unlike the wilder birds, which can be heard only by the Nature-lover who braves mosquitoes and reptiles in the wild woods, the mockingbird is almost a domestic bird, singing its choicest night-songs even in the towns, and casting a benediction upon the noise-cursed air. Sometimes it sings in a drowsy tone as if it were half asleep; at other times it suddenly makes the very quiet of the night shriek with a wild outburst of melody. To me its most moving song is not its usual medley, but the endless repetition of a single bar which seems to have caught its fancy. This is sometimes repeated until one doubts whether he is still hearing the music or its prolonged echo. Not half enough has been written about the mockingbird's song, whether it be the daylight song or the wild, brooding, melancholy strains of the darkness.

In the South, the chipping sparrow, known everywhere, sings at night in the early spring. There is little or no melody about its song at any time, but a drowsy, sleep-talking note in its nocturnal refrain is soothing, to say the least. I have often fancied that it was accidentally singing in its sleep.

The clown of birddom, the yellow-breasted chat, is too exuberant not to sing at all hours of the day and night. At any time after dark one can hear his squawks, whistles, caws, and guffaws. If he ever sleeps he merely dreams

FROM THE DARKENED FIELDS COMES THE KILLDEER'S SONG
At times it resembles the voice of the cricket; at other times it is piercing and shrill

about jokes he intends to carry out the next day.

From the night-shrouded fields in early spring comes the queer, quivering note of the killdeer. This song is akin to the notes of crickets and cicadas. At times it can almost be described—as Hawthorne described the voice of the cricket—as "a vocalized silence." At other times the killdeer circles lazily over the meadow, uttering its day calls, whose piercing sounds when they come at night, suggest restless spirits and limitless desires.

Those industrious air-feeders, the purple martins, are hardly ever quiet during their season in the South. Even if they stay in or on the martin-house at night, they are continually talking to one another in a low tone. Frequently they are skimming the air, chattering as in the daytime, pursuing the elusive insects, if not just "joy-riding." Somehow, I have never taken the industry of the martin very seriously; he seems to be having too good a time to be merely scouring the air for food. Like a goldfish, he is forever exploring his demesne, hoping to find some adventure to relieve the monotony of a cramped life. If our ancestors pictured the halcyon or kingfisher as nesting on the water, surely some modern nature fakir should tell us that the purple martin builds his nest in the very air itself, with no more substantial material than gossamers to line it with.

Much has been written of day songs of the birds, but too little about the equally great, yes, superior songs of the night. To hear them is well worth vigils in the dark.

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IT THROWS SEEDS

BY FREDA DETMERS

THE spring beauty, *Claytonia virginica,* with its pleasing little pink-striped blossoms, enlivening in early spring our woods, grassy banks and meadows, has an interesting method of throwing its seeds away from the parent plant. Thereby it extends its range and avoids overstocking a given area.

As shown in the accompanying illustration, the buds droop through the downward curving of the peduncles. As the buds approach maturity the peduncles or flower stems straighten so that the open flower is erect. The fading flower begins to droop through the downward curving of the peduncle. When the seed pod approaches maturity its stem straightens again so that the ripe pod stands erect. The seed pod splits into three valves. This opening of the pod is explosive and throws the seeds free from the plant. The seeds of some plants in a glass on the window-sill were thrown as far away as twenty-four inches. Thus does wise Nature provide for future plants.

UNVEILING THE COMMEMORATIVE MARKER AT THE WASHINGTON MEMORIAL ARBORETUM

Vernon and Eleanor Pack, children of Arthur Newton Pack (second from the left), who, with his father, Charles Lathrop Pack, gave the arboretum to New Jersey, aid in the ceremony

A MEMORIAL ARBORETUM

At once commemorating the two hundredth anniversary of the birth of George Washington and one of the outstanding events in his leadership of the cause of American freedom, an arboretum has just been dedicated at the spot on the New Jersey shore of the Delaware River where Washington and his men made the famous crossing one bitter December night.

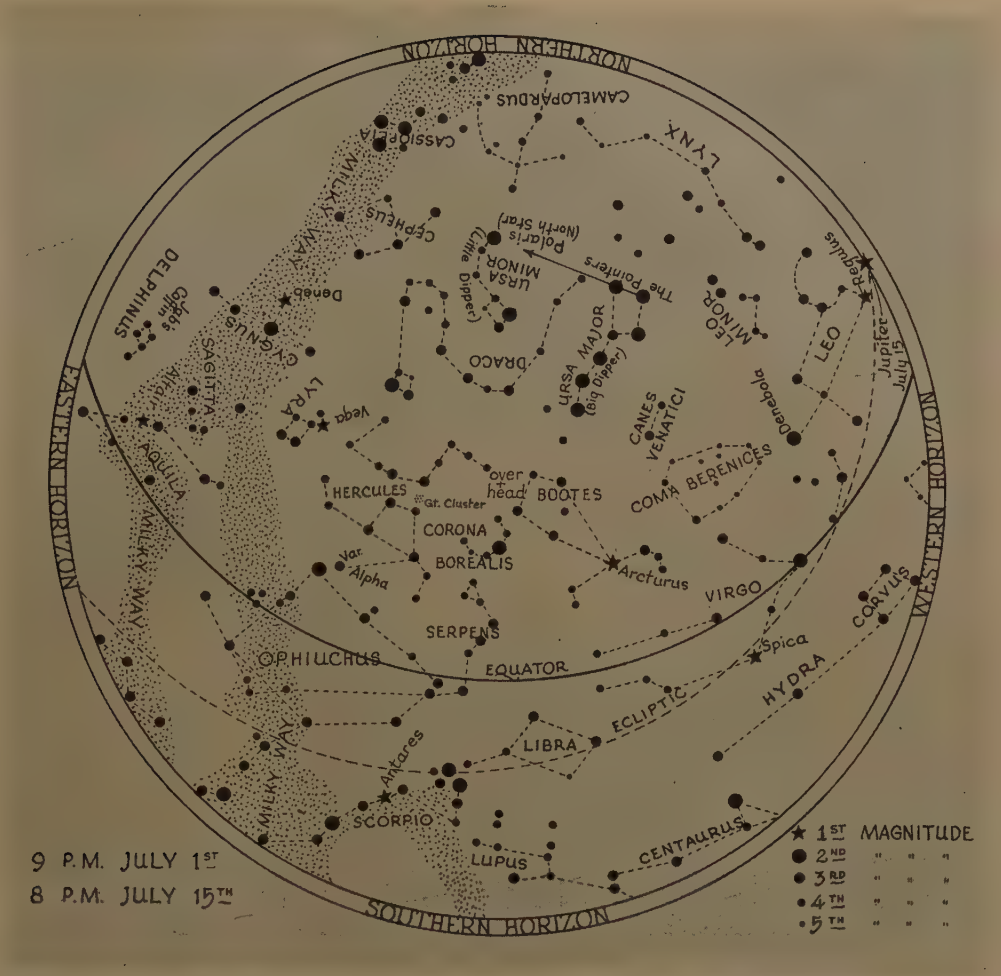
This arboretum is a gift to the people of New Jersey by Charles Lathrop Pack of Lakewood, president of the American Tree Association, and Arthur Newton Pack of Princeton, president of the American Nature Association. It is likewise a contribution to the educational system of the State typifying the conviction of the two donors that a knowledge of and love for trees are essential to the preservation of our forest wealth.

That the arboretum may be of real service it has been carefully planned and planted. Each tree is marked for purposes of identification, and all of the native trees of New Jersey are included in the area. Also many trees that have been introduced into the State have been planted and there are many smaller trees and shrubs rounding out the completeness of the arboretum. This memorial is easily accessible to visitors.

At the dedication ceremony, Mr. Arthur Newton Pack presented the area, expressing the hope that it would inspire an appreciation of tree planting and remind visitors of the great interest of George Washington in trees. On behalf of the people of New Jersey the gift was accepted by A. Harry Moore, Governor of the State; Henry L. Hoeller, State Forester; C. P. Wilber, Department of Conservation, and Dr. Charles H. Elliott, State Commissioner of Education. Dr. Henry B. Kummel presided at the dedication exercises, which were attended by delegations from patriotic societies and many school children.

On the bronze commemorative tablet one reads: "George Washington Memorial Arboretum. Trees Common to New Jersey. A Gift to the People of the State by Charles Lathrop Pack and Arthur Newton Pack."

This form of memorial is in keeping with the national campaign of Charles Lathrop Pack in connection with the George Washington bicentennial program. The American Tree Association has registered now more than seventeen million tree plantings on its national honor roll at Washington. The plantings are by thousands of schools, the American Legion, the Daughters of the American Revolution, the Women's Clubs and organizations of every kind. The Washington bicentennial tree planting is taking on many phases and many fall plantings are planned.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

SOME BRILLIANT SUMMER STARS

BY ISABEL M. LEWIS

WHEN we look at the stars on a mid-summer evening we realize that they are, on the whole, less brilliant than those on a winter evening. But there are some of these that rank among the finest in the heavens, in particular six that are to be seen above the horizon at nine in the evening on the first of July. In the order of their brightness, these six stars are Vega, Arcturus, Altair, Spica, Antares and Deneb, or Arided. The astronomer would probably refer to these same six as Alpha Lyrae, Alpha Bootes, Alpha Aquilae, Alpha Virginis, Alpha Scorpii and Alpha Cygni, by which he would indicate that each is the brightest star in the constellation mentioned.

Vega, in Lyra, is the brightest star north of the celestial equator but Arcturus, in Bootes, is very nearly the equal of Vega in brightness, as is also Capella, one of the stars that we associate with winter months. Vega and Arcturus are of zero magnitude, which means that they are two and a half times brighter than a star of standard first magnitude. Altair, the third of these six stars in order of brightness, is in the constellation of Aquila, the Eagle, and is nearly a star of standard first magnitude. Spica in Virgo, Antares in Scorpio, and Deneb in Cygnus are also classed as first magnitude stars. While they are almost exactly equal to one another in brightness they are noticeably inferior in brightness to Altair.

These six stars differ greatly among themselves in color, temperature, light-giving power, size, and distance from the earth. Deneb, or Arided, in Cygnus, the star at the top of the Northern Cross, ranks lowest among these stars in apparent brightness but its true or intrinsic brightness is twice that of all the other five combined. The luminosity of Deneb is estimated to be ten thousand times that of our own sun. At the standard distance for comparison of the absolute magnitudes or

candlepowers of the stars, which is 33 light years, our sun would be just comfortably visible to the naked eye as a star of the fifth magnitude. At this same distance Deneb would be a star of the minus fifth magnitude, or two and a half times more brilliant than Venus at her best. Deneb is inferior to the other stars named in apparent brightness because of its great distance from the earth. It is estimated that light takes 652 years, travelling at the rate of 186,000 miles per second, to come from Deneb to the earth. (The light-year, which is the popular standard for the measurement of inter-stellar distances, is the distance light travels in one year at the rate mentioned above.) It is the equivalent of 5,880 billion, or 63,310 times the distance from the earth to the sun, which is about 93,000,000 miles.

If we should make a model of the solar system in which the distance from the earth to the sun would be taken equal to one inch we could put this model in a room less than seven feet in diameter. On the same scale a light year would be almost exactly one mile. If we chose to put our model of the solar system in a room in Washington, D. C., and wished to put the six stars at their proper distances on the same scale we would place Deneb about 650 miles away in Canada. Antares would be not far from Albany; Spica would be in New York City; Arcturus in Baltimore. The distance of Vega on the same scale would be 26 miles and of Altair 16 miles. Our sun would be less than one-hundredth of an inch in diameter but the diameter of Antares would be more than four inches.

Antares, which is at a distance of 362 light years from the earth, is, like Deneb, one of the super-giant stars, with a luminosity 3,400 times that of the sun. This star is noted for its enormous size. It has the greatest known diameter—about 400,000,000 miles—of any star, and if placed at the center of the solar system its surface would lie far beyond the orbit of Mars. Spica, in Virgo, comes next to Antares, having light-giving power which is 1500 times that of the sun. The luminosity of Arcturus is 100, of Vega 50 and of Altair 9 times that of the sun. All of these stars, then, outshine our own sun in brightness and also differ greatly from one another in light-giving power. They also differ noticeably in color and in their surface temperatures which are indicated by their colors. The hottest stars are the bluish-white helium stars; the coolest the red stars. Vega, we note, is a pale sapphire in color. It is often called the Arc-Light of the Sky. Spica is white, slightly tinged with blue; Deneb brilliant white; Altair pale yellow; Arcturus orange and Antares fiery red. By far the hottest of these stars is Spica with a surface temperature of 20,000 degrees Centigrade. Vega comes next with a temperature of about 11,200 C. Deneb also is an extremely hot star with a temperature of 10,000 C. Altair has a surface temperature of 8,600 degrees. Orange-hued Arcturus is comparatively cool with a temperature of about 4,300 degrees and the red super-giant Antares in Scorpio is the coolest of all with a temperature as low as 3,100 degrees.

One may readily note, almost at one glance, the contrasting colors of blue-white Vega and fiery Antares, yellowish-red Arcturus and the brilliantly white Spica. Deneb and Altair, now far over in the eastern sky, will be seen to better advantage later in the night.

Two of these stars are double. Antares' fiery red is in strong contrast to the emerald green of its fifth magnitude companion star, which lies so close to its brilliant neighbor that it is not easily found in small telescopes. Spica has an obscure companion star revolving around the brighter star at a distance of about four million miles from it in a period of four days.

Each one of these stars we may remember by some distinctive feature or characteristic that distinguishes it from the others.

Deneb we think of as by far the most brilliant, intrinsically, and most distant of these six stars that are so conspicuous in summer. We recall that its light takes six and a half centuries to reach us and that it gives forth ten thousand times as much light as the sun. It lies in the Milky Way in Cygnus now in the northeastern sky.

Altair we may remember as the nearest of the six stars. It is only 16 light years distant from the earth and only about nine times more luminous. It is in Aquila, The Eagle, also in the Milky Way and now not far above the eastern horizon. It will be in fine position for observation throughout the summer and fall.

Vega, in the small constellation of Lyra, is noted for the fact that it is also a near neighbor, only 26 light years distant. Also it lies near the Apex of the Sun's Way or the point in the heavens toward which the solar system is moving. It is, in addition, the brightest star in the northern hemisphere. Vega was the pole-star about 14,000 years ago and it will again be the pole-star 11,500 years hence. Vega is now high in the heavens east of the zenith.

Antares, now nearly due south, in the constellation of the Scorpion, is the star that has the greatest known diameter, 400,000,000 miles, and the lowest temperature of any of these stars.

Arcturus, now west of the meridian, is noted for its rapid motion through space. Since the days of Ptolemy it has moved southwestward a distance equal to twice the diameter of the moon. It has been one of the most widely known stars in all ages and was probably one of the first to be named. In ancient times it was occasionally confounded with the constellation of the Greater Bear and in the Book of Job the reference to Arcturus is to the Bear and not to this star.

Spica in Virgo, now far over in the southwest, is noted particularly for its high surface temperature of 20,000 degrees. Its distance from the earth is about 230 light years. Spica is supposed to be the Ear of Wheat in the left hand of The Virgin, symbolic of the harvest, and the name has this meaning. It is also remarkable for the fact that it is a spectroscopic binary star, that is a star that has been found to have a companion star through the shift in the spectral lines of the brighter star, a result of the revolution of the two stars about their common center of gravity. (Continued on page 47)

NATURE RAMBLES WITH UNCLE DICK

Bill Finley is the Field Naturalist and Wild Life Photographer of Nature Magazine's staff. He has had many wild pets, whose lives he has studied and of whom he has taken pictures. In this and coming issues of Nature Magazine, Bill will tell Uncle Dick about these pets and he will pass the story on to you.

• • •

BEARS ARE FUNNY

"BILL," I said, sitting in the easy chair on the porch, "of all the wild animals you have met, which is the most interesting?"

Bill shook his head. He thought a moment. Then he said:

"Bears, I guess. Of course they are all interesting. But there is something about bears that makes them different. Black bears more than any others."

"Why black bears?" I asked.

"Seems to me as though they are the most human of all the wild animals. They are almost always happy. They are sort of lazy like a lot of us. They bluff, like a lot more of us. And they are funny to watch. I'll bet I laughed more at the two cubs I had once than any other wild pets that have come here."

Bill chuckled to himself. I waited for him to go on. When Bill chuckles I know it means a story.

"Yes," he said, "those baby black bear twins were fun. When I got them they had just got their eyes open. One of them would just fit into my two hands, cupped together. You know the baby bear weighs less than a pound when he is born. His ma may weigh three hundred pounds. But she has got to feed at least two little fellows—sometimes it is three—for maybe a month and a half before she leaves her cave in the spring and gets something to eat for herself. So great big babies would be too much for her to nurse. That is how Nature takes care of her wild things.

"Well these two babies, with their soft hair and baby ways, had to be fed by us humans. A nursing bottle, a nipple, and warm milk gave us the way to do it. It did not take long for the little fellows to get the idea. They would take the bottle and roll over on their backs and suck themselves to sleep. But when they were hungry! My, what a row! They sounded just like hungry babies and they would never stop until you got up and heated the milk and gave them their bottle. But when they got older and ate out of a pan,—then there was trouble. One pan was never big enough. One cub could never eat alone if the other was around. There would always be a fight. It was usually a rough fight, too, because it meant that the cub that won got the food. They would get rough, too, when we played with them. And it did no good to box their ears for roughness. They only got rougher. They always seemed to like a fight and want to be where one was going on."

THE HUNGRY BABY BEAR TAKES HIS MEAL OUT OF A BOTTLE AS THOUGH BORN TO IT

"That is the way with bears, isn't it?" I asked.

"No," Bill replied, "I wouldn't say that. At least not so far as black bears and humans go. The only really bad bears, the way I see it, are mother bears who are afraid you will hurt their babies, bears that have been wounded, and surprised bears. Of course you can't tell just what a bear is going to do any more than

you can tell what people are going to do. And it doesn't pay to take chances. But out in the woods where bears are really wild you don't often see them. They aren't looking for a fight with you and if you leave them alone they will leave you alone."

"But you must have had some close calls with bears," I insisted.

"Oh, yes," Bill laughed, "I've been scared plenty of times by bears. I guess the time I was the most scared was once in Yellowstone Park. Of course the bears there are protected and quite tame. There was a mother bear and a pair of cubs. Ma was not so friendly but the cubs were. One of them toddled up to see me and I gave him a syrup can with some food in it. Then I sat down on the steps of the cook house to change the film in my camera. Suddenly around the corner of the house came his mother. 'Woof! Woof!' she said and started for me. I couldn't run. I was too scared to think. And I didn't have time. So I just sat there looking at mother bear. There were no more than eight feet between us when she put on the brakes. We looked right at each other. The minute seemed like an hour. My heart must have sounded like a drum being beaten. Then the old ma bear slowly turned and walked away. So did I, but in the other direction." Bill paused.

"Yes," he said, "bears are funny."

"So I see," I replied.

But I was thinking that if that adventure with a cross bear had been *mine* I wouldn't have thought it was so funny.

Here is a simple drawing of the front cover of this issue of Nature Magazine. Look at the picture on the cover. Study the colors. Then see whether you can color this drawing correctly without looking again at the cover.

• • •

Here are ten questions about Nature. See if you know the answers or can find them out. Copy the questions on a piece of paper and write the answers. Then see these pages next month for the answers.

1. Is a bat a bird?
2. Do birds have teeth?
3. What is the largest American cat?
4. Do any birds sleep standing on one leg?
5. What do bears do in the winter?
6. What is the State Bird of Kentucky?
7. Is a whale a fish?
8. What is the largest American bird?
9. Does the female mosquito bite?
10. What is the smallest American bird?

PRINNY

BY MATILDA B. DOLAND

PRINNY, WITH TEDDY, ONE OF HIS CAT FRIENDS ON THE BIG FARM

PRINNY'S mother was a cocker spaniel. His father was a collie. The coat on his back was long and black. He had a white vest and a big white tip on his tail. He wore white stockings and shoes.

Prinny lived at Hunting Hill Farm. He was a friend to all the animals on the farm. He loved to take long walks in the woods and through the orchards. He loved to climb stone walls and dash through the thick grass. When he was tired he would rest on the porch while the kittens would play with his soft ears and sleep in the safety of his great paws. Prinny was a big dog.

When I told my friends that I was taking my kittens to the Farm for the summer they said, "But there is a big black dog there!" I only smiled and took them. They met Prinny. We held each kitten before him. He smelled of each one while we said, "Gently, Prinny, gently!" And Prinny was gentle to them. But he had a choice among them. This was Dotty, the very youngest and tiniest kitten.

One morning Dotty was missing. We hunted everywhere for her. When we could think of no other place to look we woke Prinny from a nap.

"Prinny," we said, "where is the littlest kitty?"

Prinny seemed to think. Then he led us to a big maple. There, sitting on the lowest branch, was Dotty. She was crying because she didn't want to stay there and was afraid to come down the long, straight trunk. We had no ladder that would reach her. So we got a big hay fork. On one spear of the fork we stuck a small market basket. We stuck the fork into the limb so that the basket was right under Dotty. But she just clung to the tree and wouldn't jump into the basket. We tried putting fish into the basket. Dotty wanted the fish but she was afraid to jump. It seemed so far.

"Woof! Woof!" said Prinny to Dotty. Then he turned and ran around the house. We thought Prinny had an idea. He had.

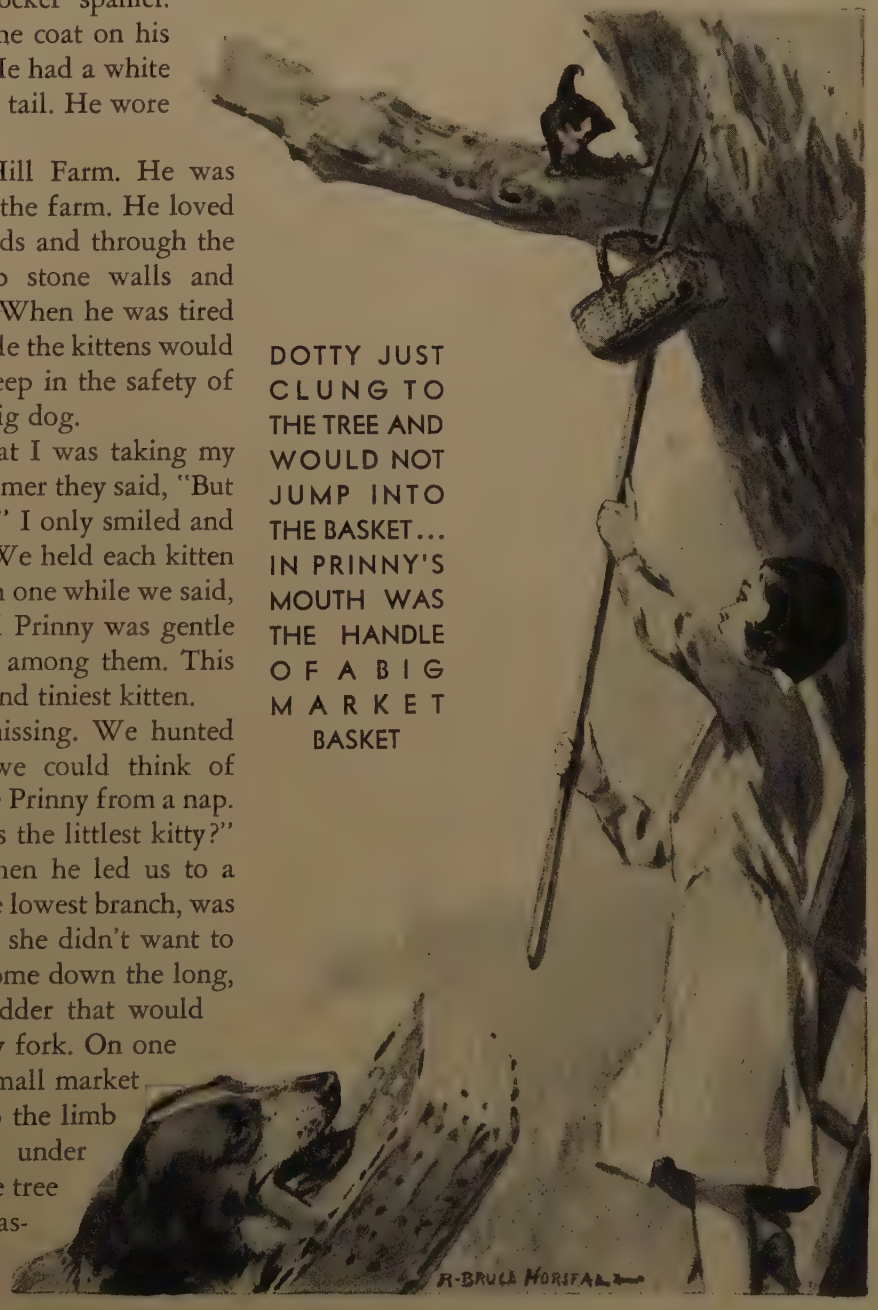
In a minute Prinny was back. His eyes were shining. His tail was waving. In his mouth was the handle of a big market basket.

"You think the other basket is too small, do you, Prinny?" we said. So we put the larger basket on the hay fork and stuck it up under Dotty.

"Woof! Woof!" said Prinny. Dotty jumped.

"Woof! Woof!" said Prinny, but I think he meant, "Brave girl, Dotty."

Prinny capered happily until Dotty had her feet again on the ground. She got out of the basket and kissed Prinny's nose. And then they shared the fish.



DOTTY JUST CLUNG TO THE TREE AND WOULD NOT JUMP INTO THE BASKET... IN PRINNY'S MOUTH WAS THE HANDLE OF A BIG MARKET BASKET

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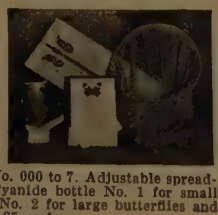

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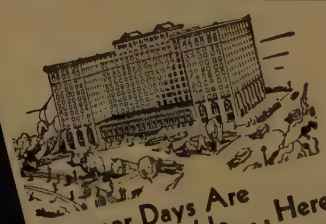

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A Tug-of-War

Here is one for Ripley—a tug-of-war between a fair co-ed and a weasel. The unusual contest occurred on the High Drive in Colorado's Rocky Mountain Park last winter when a group of students from Colorado Agricultural College was hunting elk. The students, according to *Nature Notes,* were digging out one of their cars when they noticed a weasel watching them. He finally came from his shelter under a protective rock, revealing himself in the full beauty of his white winter coat with the tell-tale black tail tip; then he calmly proceeded to go back to his den, pulled out a half-grown rabbit and began to drag it up a hill. One of the party snatched the creature from him, and the group examined it while the killer stood nervously by. One of the girls then held the rabbit by the hind legs and offered it to him. He quickly leaped forward, grasped the neck of the dead animal, and started to pull. No fear at all did he display. He tried to jerk the morsel away, got under it and tried to carry it off on his shoulder, and at last gave up and eyed the group belligerently. When the rabbit was finally thrown away, he bounded to it, dragged it to his den, and disappeared in a flash.

The Band-Tailed Pigeon

A warning that unless man exercises keen vigilance, the western band-tailed pigeon may follow the passenger pigeon, the auk and the Carolina paroquet to extinction, is voiced by Judge Walter Fry of Sequoia National Park. Judge Fry believes that this handsome bird, which frequents the park, is not holding its own, due to human killing and disease contracted from domestic fowl. The bird is most distinctive, with bluish gray on the upper surface of its body, pinkish brown beneath, and a white crescent stripe across the nape and a dark band across the tail. It ranges from the cool forest regions of the Rocky Mountains westward to the Pacific, from British Columbia to Mexico, and regularly occurs between 3,500 and 6,500 feet in altitude. Being a large bird about fifteen inches long, it makes an easy target, and although protected by law, is frequently shot. Every effort should be made to prevent its disappearance.

How to Live

The importance of natural processes and the products of Nature in health is the theme of *Live or Die,* an interesting book by John X. Loughran. The author, who has written considerably on health, points to many items of diet, breathing, posture and exercise that Nature intended man to observe in keeping alive and well. It is a simple, straightforward presentation of simple facts that most people overlook or forget in the mad scramble to use patent medicines and to believe the extravagant claims on labels. The publishers are the Rudor Publishing Company, 438 West 37th Street, New York City.

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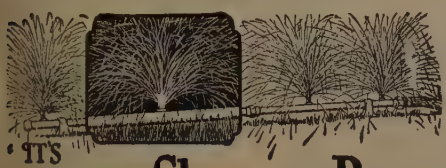

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Write to Garden Editor,
Nature Magazine,
Washington, D. C.

NATURE IN PRINT

As a convenience to readers to whom book stores are not easily accessible the books reviewed in this department of Nature Magazine may be ordered through our own book department.

A Notable Book

Many books dealing with Nature from varying general and special angles are published every year. Probably the majority of these are valuable contributions to natural history literature,—competent, accurate and carefully prepared. Rarely, however, is there one that is truly inspiring. Such a book is *Lives* by Gustav Eckstein. We confess that we have never before read anything from this author's pen. We promise that we shall never, knowingly, miss anything that he writes in the future. That is how we feel about this immediate volume. Between its covers have been collected a group of true stories of the author's pets—two white rats, a macaw, three tortoises, seven cats, a number of canaries. And this does not mention Joe, who was hardly a pet but whose story is one of the most fascinating biographies we have yet encountered. Many people might have pets such as Mr. Eckstein had, but we doubt whether any could write about them as he has done. It seems inappropriate to describe this book with adjectives because its author proves that into a simple style of writing can be packed more true pictures than can be painted by a superabundance of words. We have, then, a book that is written straight from a heart that understands those who have few means to make us understand. Harper and Brothers have given to the volume an unusually effective typographical treatment. We enthusiastically recommend *Lives* to all who love Nature and intelligent writing.

R. W. W.

Century of Yosemite

To all who have been in Yosemite Valley —and their name is legion—*100 Years in Yosemite* will be of outstanding interest. Written by Carl Parcher Russell, field naturalist of the National Park Service, this volume just issued from the Stanford University Press is a distinct contribution to the historical literature of California. As a sub-title to his book Mr. Russell chooses "The Romantic Story of Early Human Affairs in the Central Sierra Nevada". And a romantic story it is—a story of discovery, exploration and appreciation of beauty. It is a story of Indian warfare; of struggle to perpetuate the natural beauty of the region that it might be enjoyed by future generations; of development to care for the thousands that, winter and summer, flock to the high sierra to enjoy their glories. Mr. Russell has done a fine piece of work, carefully and ably assembling the facts of history and

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weaving them into an entertaining and informative narrative. The book is illuminated by many illustrations of historical interest. Yosemite lovers will feel that the price of $3.50 is not too much for such a book.

All Is Chemical

In our high school days we were a notable failure at Chemistry. Being passably successful in other studies we have often wondered at this. Now, we think, we know. The revelation arises from reading, for purposes of review, *The Story of Common Things* by Louis Ehrenfield. To become historical again, when we were introduced to chemistry it was through an unattractive, if not repelling, textbook. We were immediately introduced to a lot of formulas. We were impressed by potential difficulties upon first seeing the chemistry lab. In other words we had no urge to embrace chemistry and had no background. We just squeezed by. On the other hand had we read this book by Mr. Ehrenfield we would have had that background and, too, the urge. We would have been introduced to chemistry through an attractive, even, at times, romantic narrative of the fundamental significance of chemistry. We could not have escaped the desire to know more; to prove in the manner of chemists, things described in this book. In other words we recommend this volume to anyone who is about to study chemistry, who is finding it difficult or who is just curious about things. The publishers are Minton, Balch and Company, 2 West 45th St., New York City, and the book is listed at $2.50.—R. W. W.

A Tree Book

There is no lack of books about trees—good books—but, also, there seems to be no lack of demand for them. We can, therefore, extend a cordial welcome to *The Book of Trees* by Alfred C. Hottes, associate editor of *Better Homes and Gardens*. In his book Mr. Hottes has combined a lot of useful and valuable information now only available from the pages of several books. For example he has chapters on trees important in American history, on favorite tree poems, on street trees, on roadside trees, on nut culture, on trees and erosion. He covers transplanting, pruning and propagation. He provides a variety of helpful lists for various purposes and devotes adequate space to discussion by species of important deciduous and coniferous trees. In other words he has compiled an all-around handbook for the tree lover and the tree planter. The illustrations in the book are practical when covering some phase of care, and otherwise attractive in showing the characteristics of specific trees and their blooms. The publishers are the A. T. De La Mare Company, 438 West 37th Street, New York City, and the list price is three dollars.

A Garden Diary

Here is a delightful and amusing little book translated from the French and here appearing under the title of *Laura's Garden*. It is the diary from March to November of a lady whose love for her garden is mitigated by a neat sense of humor. It is the work of Count de Comminges and is translated by Bernard Miall. The publishers are the Macmillan Company, who list this attractive little volume at two dollars.

MAPLEWOOD, a highland estate of 1,500 acres on a plateau in the heart of the White Mountains of New Hampshire "The Switzerland of America," is three hundred and thirty miles northeast of New York and one hundred and seventy-five miles almost due north from Boston. It is located on the Boston & Maine Railroad and the Theodore Roosevelt Trans-Continental Motor Highway.

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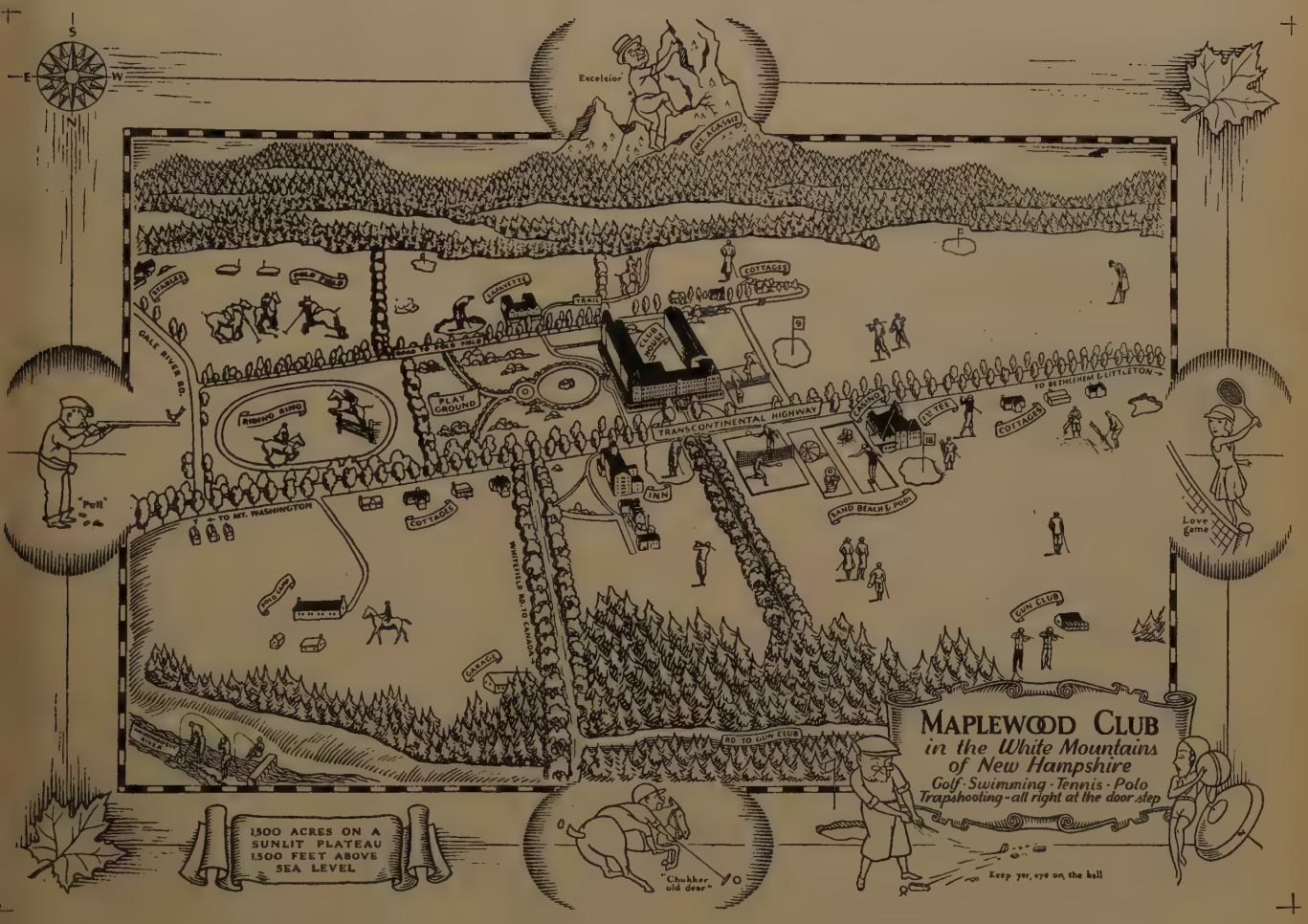

Golf, on an 18-hole course, is sufficiently varied in character to hold the interest of the most ardent player, yet so planned as to please the average player. It has been called "the most enjoyable golf course in America." The New Hampshire Amateur Golf Championship has been played a number of times on the Maplewood Course and The White Mountain Amateur Golf Championship is an annual event here.

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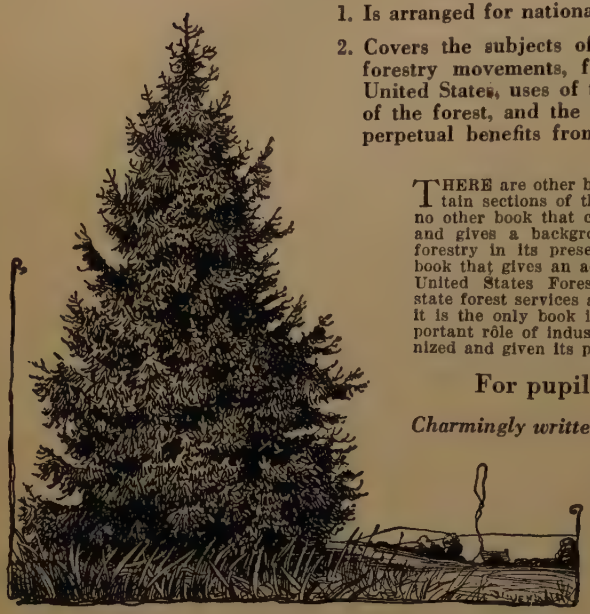

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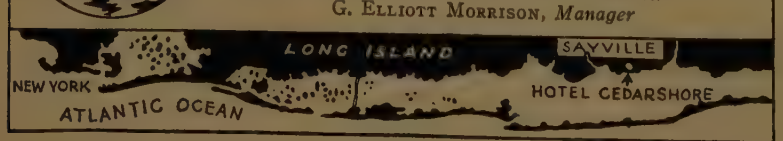

DOG AND OTHER PET LOVERS

It is often difficult to know just where to get the sort of dog you wish or where a certain type of pet can be purchased. The Pet Editor of Nature Magazine will be glad to help you if you will just write him.

Readers with a Difference

Memories of first readers cling. "I see the dog. The dog sees me." is as classic an opening as "All Gaul is divided in three parts", or "The stag at eve had drunk his fill." Most of these volumes were highly uninteresting, and usually the child, after painfully deciphering the hieroglyphics, felt cheated at the reward for his diligence. This fault does not exist, however, in two new readers still warm from the Macmillan press. They have been written by the well-known Nature writer, Edith M. Patch, collaborating with Harrison E. Howe, and deal with the everyday out-of-door wild life that continually stirs a youngster's curiosity. By use of these volumes, entitled *Hunting* and *Outdoor Visits*, the child learns the names of the birds, flowers and animals he sees in city parks, country fields or woodlands. He likewise digs out for himself a few significant facts about each of these things—facts he can verify from his own observation, and thus doubly impress them on his mind. The two books are more than readers; they are keys that open the first doors to Nature. Admirably illustrated, excellently worded to conform largely to the Gates and Thorndike lists, and interestingly written, they lend themselves to wide use. We hope the authors will bring out other readers in the near future. *Hunting* is priced at $.80 and *Outdoor Visits* at $.84.

A Book for Boys

Hidden Island is a worthwhile book for the boy who loves the outdoors and the wild Nature that he finds there. Tom Benson's family has been moved to the country to live, and, with his buddy, Bill, Tom discovers many things that he had no inkling of before. His explorations of forest and swamp yield many fascinating discoveries and provide many exciting experiences. The general slant of the story is revealed in an excellent conversation between three boys in which the superiority of the camera over the gun as an implement of hunting is thoroughly established. This book is good boy fiction with the proper but not too obtrusive slant. The author is Anworth Rutherford and the publishers are Little, Brown and Company. The price is two dollars.

Sequoia Animals Surveyed

Of the sixty-three species of animals inhabiting Sequoia National Park in 1906, two have increased, thirty-five have held their own, twenty-one have been greatly reduced, three are verging on extinction, and two have disappeared. These statistics are taken from records kept by Judge Walter Fry during the last quarter of a century. Bears and deer have increased at least sixty per cent. Trapping, according to Judge Fry, has been responsible for a serious depletion in the ranks of fur-bearers. Mountain sheep, badgers and wolverines are verging on extinction. The gray wolf and the California jack rabbit have disappeared, while the opossum, an animal foreign to the region, arrived in 1924. Judge Fry looks for a marked increase of animals within the park in the next twenty-five years, due to the enlargement of the park and the creation of the Sequoia National Game Refuge.

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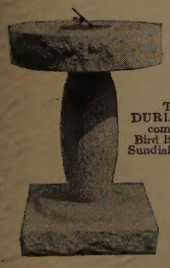

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SOME BRILLIANT SUMMER STARS

(Continued from page 38)

The companion cannot be seen visually in the telescope, so close together are the two.

In addition to these six interesting stars of the first magnitude in the evening sky the planet Saturn will be visible throughout the night. On July 22 it will attain its greatest brilliance of the year when it will be about equal to Arcturus in brightness. On July 24 it will be due south on the meridian at midnight, in the constellation of Capricornus. Its rings are easily visible in the smallest telescopes. In color Saturn is a pale yellow.

Jupiter is now approaching the sun and is not favorably placed for observation. On July 15 it sets about an hour and a half after the sun. Venus is a morning star and rises about one hour before the sun on July 15. It is now in the constellation of Gemini. Mars is in Taurus and is well in view in the eastern sky just before sunrise. Mercury is an evening star this month. It reaches its greatest elongation east on July 20.

Summer Rambles

One of a group of four books is *Nature Rambles: Summer* by Oliver P. Medsger. Obviously the other three are devoted to the other three seasons, Spring already having been published and Autumn and Winter being in process of preparation. The author proceeds from the not unfamiliar premise that close at hand, in adjoining fields or even in one's back yard, there is infinite Nature to observe. His book will help many better to realize that this is true. The book has the further advantage of excellent illustration, including sixteen plates in color.

Rocks and Minerals

According to our latest information on the votes cast in the contest for selection of a National Rock and a National Mineral, granite has a substantial lead over marble for first honors as the most popular rock, while quartz is running a close race with gold for mineral popularity. Coal in the rock class and garnet in the mineral group are in third place. The vote is being taken by *Rocks and Minerals Magazine*, published at Peekskill, New York. If you want to get your vote in write to the magazine.

For Nature Poets

For the seventh successive year the Chattanooga Writers' Club announces the Elberta Clark Walker Memorial Prize poetry contest. Only original poems are accepted, one poem to be submitted by each entrant. There are two classifications, one for Nature poets everywhere and the other for southern writers. Full details about the contest can be obtained by writing to Lillian V. Porter, 1503 Chamberlain Avenue, Chattanooga, Tennessee.

A Correction

In the article on Page 351 of the June issue of NATURE MAGAZINE entitled "Why They Survive", a typographical error crept in, with the result that a wasp-like bug was given the name of "a Renoid". This should have been Reduvid. We apologize to the author, Paul Griswold Howes, and regret the slip.

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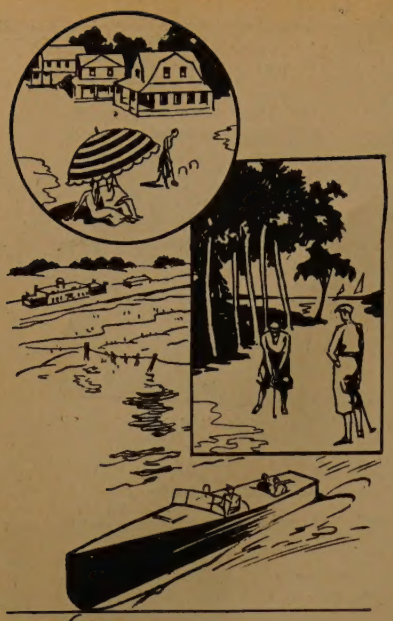

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INDEX TO ADVERTISERS

BINOCULARS

Bausch & Lomb Optical Co. 3
DuMaurier Co. 3
DuMaurier Importers 44
Kollmorgen Optical Corp. 3
Loring, J. A. 3

BIRD HOUSES

Packard, Winthrop 42

BOOKS

Bird and Animal Paintings . . Third Cover
Birds of the States . . . . . Third Cover
Bound Volumes 48
Forest Facts for Schools 46
Forests and Mankind 47
Nature Almanac . . . . . Third Cover
Nature Binder 48
Roadside Bulletin . . . . . Second Cover

EDUCATIONAL

Newspaper Institute 2
New York State College of Forestry . . . 47
Pennsylvania State College 47
Wimmer, Don H. 44

GARDEN & ACCESSORIES

Burpee, W. Atlee Co. 43
Carleton Club 44
Gibbs, W. A., & Son, Inc. 43
Howells Water Garden 44
Hudelson, H. M. 43
Klein Mfg. Co. 43
Longfield Iris Farm 43
National Iris Gardens 43
Ransom Nursery 43
Rowedders, The 47
Salbach, Carl 43
Tobacco By-Products Corp. 43
White Showers, Inc. 43

HOTELS

Admiral Hotel . . . . . Third Cover
Cedarshore Hotel 46
Drake Hotel 42
Harrison Hotel 44
Maplewood Club 45
Morrison Hotel . . . . . Second Cover
Piccadilly Hotel 44
Seymour Hotel . . . . . Second Cover
Wyandotte Hotel 48

MISCELLANEOUS

Donner, E. 44
Glanz, A. 42
New York Biological Supply Co. 47
Rialto Stamp Co. 44

PETS AND THEIR CARE

Battle Creek Dog Food Co. 42
Birdland 42
Chappel Brothers, Inc. 42
Comrade Farm Kennels 42
Costa Mesa Bird Farm 42
Hoffman's Aviaries 44
Lemley, Vernon 44
Locke, Otto Martin 44
Rockland Farms 44
Summit Rabbitry 44
Walker Associates, Inc. 44
William Cooper & Nephews, Inc. 42

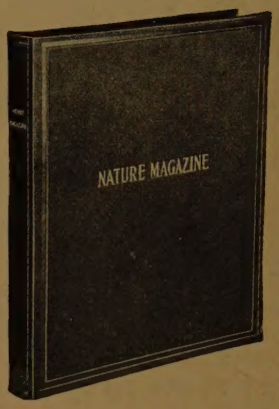
PHOTOGRAPHIC

Folmer Graflex Corp. 1
Gibson Photo Co. 44
Goerz, C. P. 3
Willoughby's 2

SPORTING GOODS

Bean, L. L. 47

UNIQUE GIFTS



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On pages 229 to 236 of the April Nature Magazine there were published eight pages devoted to The Birds of the States. This was the first section of a sixteen-page special colored feature devoted to this subject. The remaining twenty-four colored pictures of the State Birds will be published in subsequent issues.

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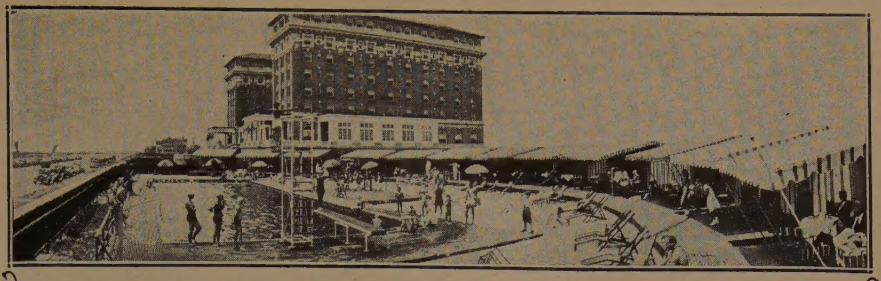

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